THE HUNGARIAN LABOUR MARKET
2013

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FOREWORD BY THE EDITORS

The Hungarian Labour Market Yearbook series was launched in 2000 with the support of the National Employment Foundation (OFA). The yearbook presents the main characteristics of Hungarian employment policy and each year features an in-depth analysis of a topical issue. The editorial board has striven, from the beginning, to provide up-to-date results of labour market research and useful information on the Hungarian labour market tendencies as well as the legislative and institutional background of the employment policy of the GO and NGO organizations of the public employment services, local governments, the public administration, educational and research organisations and – last but not least – for both the press and the electronic media. This year we have also created a clearly structured and easily accessible volume that presents the main characteristics and trends of the Hungarian labour market on the basis of available statistics, conceptual research and empirical analysis. Continuing our previous editorial practice, we selected an area that we consider especially important from the perspective of understanding labour market trends in Hungary and effective evidence-based policy making. The book has four main sections.

The Hungarian labour market in 2011–2012

The economic recovery from the crisis slowed down in the middle of 2011 and by the start of 2012 the performance of the Hungarian economy – similarly to the other European countries – once again declined. In addition to the unfavourable long-term economic prospects, demand for labour also persistently declined, thus the employment rate is below its pre-crisis level. As a result of government measures aimed at increasing activity, the activity rate reached a level unprecedented since the early 1990s. Another related issue is that people who become unemployed are least likely to exit the labour market and that keeps the rate of unemployment high in an unfavourable economic environment. Although this is worrying, it is a more favourable situation than, for example, expanding the possibilities of retirement. The increased intensity of public works programmes in the past two years helped to prevent the further growth of unemployment although it could not reduce it. There is no reliable information on the impact of recent changes in public works programmes, namely the lengthier employment opportunities, on entry into the open labour market. There were also considerable regional disparities in the development of employment. At the beginning of the crisis, the situation of the central and Transdanubian regions which had been characterised by higher economic activity deteriorated relatively quickly and

the unemployment rate stabilised at a much higher level than the average of previous years. Public works programmes aimed at alleviating the further deteriorating situation of the Northern and Eastern regions that had been affected by high unemployment even prior to the crises.

Companies adjusted to the low economic output of previous years not only through levels of employment but also through wages. The dynamics of gross average wages in the business sector slowed down, and the level of less rigid real wages stagnated over recent years. At the same time the public sector was forced to cut wages and non-salary benefits. There were significant changes in the tax burden on labour in recent years. In 2012 the personal income tax effectively became dual-rate, which increased the tax burden on those earning less than the average wage, while it reduced the burden on those earning above the average wage: to offset the net loss of income among the low-paid, the Government increased the minimum wage by 20%. To date there is insufficient information on the impact of tax realignment on labour supply because further changes are expected in labour taxation in 2013.

In Focus

This year's *In Focus* consists of two parts. *Part I* focuses on the impact of taxes and transfers on the labour market. Although the primary purpose of taxes and transfers is to create revenues to fund public expenditures and redistribute income, their impact on the labour market is also crucial because they influence, and in some cases jeopardise, the sustainability of the system. Therefore it is very important to understand these effects as much as possible. Current Hungarian research in this area – building on our rich heritage of labour economics research – produced some interesting findings and perspectives and generated exciting debates. An important development has been that this was not limited to academic circles, but there have been also numerous attempts to communicate the results to policymaking and to emphasize the importance of evidence-based policymaking.

Meanwhile there has been a boom in the international literature on public economics – inspired by the works of Raj Chetty and Emmanuel Saez. The fifth volume of the *Handbook of Public Economics* provides a detailed overview of this process. This exciting period – when a "new consensus" is emerging on the empirical assessment of the elasticity of labour supply to taxation – also brought normativity, optimal tax rate and tax system considerations back into the picture. It certainly involves serious debates – mostly about the taxation of the top 1% of the income distribution, or that of capital income. We would like to make this diverse, innovative and active literature more widely known in Hungary. The chapters in the first part of *In Focus* provide further references and a starting point for this.

The first, introductory chapter – written by the editors, Péter Benczúr and László Sándor – sets out the common conceptual framework of this section, with particular focus on the role of transfers and taxes in the static model of labour supply and demand. In addition it provides a detailed and comprehensive overview of the recent

empirical literature on labour supply elasticities. The second part of the introduction reviews the main results and the open questions of international academic research on income taxation drawing heavily on reviews in the *Mirrlees Review* and the forthcoming fifth volume of the *Handbook of Public Economics*. The *Appendix* (by Mónika Bálint) provides a description of Hungarian databases that are used in the impact assessment of taxes and transfers, to date less well-known in labour market research.

Chapter 2 examines the intensive margin of labour supply, more precisely the elasticity of taxable income (written by Péter Benczúr, Áron Kiss and Pálma Mosberger). First, it gives an overview of the international literature on the subject – in greater detail than other overviews already available in Hungarian – focusing on aspects relevant from the perspective of economic policy. Then the chapter presents the findings of two previous studies that used data from Hungary to estimate the elasticity of taxable income. Finally, it demonstrates the use of estimated elasticities in "optimal tax rate" model simulations.

Chapter 3 looks at employment, more precisely: the labour market participation decision, also known as the extensive margin of labour supply (authors: Gábor Kátay and Ágota Scharle). It considers two main issues: on the one hand it examines the impact of the tax and transfers system on decisions about labour market participation based on the findings of a recent empirical study. And on the other hand it summarises how the system of unemployment assistance encourages or deters efficient job search and job take-up.

Chapter 4 presents the utilization of a heterogeneous household microsimulation model for assessing the impact of the tax and transfer reforms on the economy (authors: Dóra Benedek, Gábor Kátay and Áron Kiss). It starts with a brief overview of the application of microsimulation methods abroad and in Hungary. Then it briefly presents a microsimulation model developed in the Magyar Nemzeti Bank (the central bank in Hungary) that can be used to assess the long-term employment and macro-economic impacts of hypothetical and real changes in taxation and transfers.

Chapter 5 shifts the focus from labour supply and employees to employers and labour demand. Following a brief general introduction (written by Árpád Földessy and Ágota Scharle) it gives an overview of previous findings and experiences related to the impact of wage subsidies (authors: Péter Galasi and Gyula Nagy), and then presents the results of a recent study on the impact of the "START card" wage subsidy scheme (authors: Zsombor Cseres-Gergely, Árpád Földessy and Ágota Scharle). The fourth sub-chapter explores another large area of state intervention – minimum wages (authors: Ágota Scharle and Balázs Váradi). It summarises the potential impact of the targeted reduction of the minimum wage as a tool to increase employment based on Hungarian and international literature. The final, fifth sub-chapter reviews the international literature on the long-run equivalence of employee and employer contributions (by Árpád Földessy).

The final chapter, *Chapter 6* of *In Focus – I* analyzes the issue of labour market related tax avoidance and evasion (authors: Dóra Benedek, Péter Elek and János

Köllő). Following a brief conceptual introduction to the international literature on the prevalence of the shadow economy and undeclared work, the chapter goes on to examine undeclared employment and tax evasion among businesses in Hungary using detailed micro-level data. Finally, the last sub-chapter analyses the income redistribution aspects of tax evasion using micro-level data. The chapter also contains three special topic boxes: István János Tóth and Mihály Fazekas preview their recent results from a survey on envelope wages, providing a first evaluation of the impact of the crisis on income underreporting. Mirco Tonin reviews his earlier research results on the link between minimum wage regulation and tax evasion. And finally, Árpád Földessy and Ágota Scharle analyze the impact of temporary employment booklets (alkalmi munkavállalói könyv) on black and grey employment.

In Focus – Part II provides a summary of studies exploring the impact of company characteristics on workers' wages and employment opportunities. The introduction briefly discusses potential reasons why company characteristics can influence workers' wages. Then it presents the main methodological features of databases suitable for the analysis of this topic and finally presents the subject of the chapters: collective agreements, participation in international trade, foreign ownership and privatisation.

Chapter 1 on collective agreements (by Mariann Rigó) shows that the unconditional wage gap between workers in companies with or without collective agreements is relatively large (over 20%) and it is not reduced substantially if individual differences are taken into account. However, controlling for observed company characteristics significantly reduces the wage gap to 3–3.5%. If unobserved company characteristics are also controlled for then this is further reduced to 2–2.5%.

Chapter 2 (by John Sutherland Earle and Álmos Telegdy) examines how workers' wages change following the acquisition of a local business by a foreign company. Foreign-owned companies pay 46–60% higher wages to their workers, however if observed and unobserved characteristics are controlled for, this effect is halved. The effect is heterogeneous: younger and skilled workers receive higher pay increases than their less skilled colleagues; nevertheless wages go up for all categories of workers following acquisition.

Chapter 3 (by John Sutherland Earle and Álmos Telegdy) explores how privatisation alters workers' wages and the employment level of companies. This is a very important question because a widely shared view among policy makers and the public is that privatisation will lead to redundancy and lower wages. The first part of the study looks at the employment outcomes of privatisation using databases from five Central Eastern European countries (Hungary, Lithuania, Romania, Russia and Ukraine). Despite fears privatisation did not lead to substantial redundancies, at least not when they were compared to companies that remained in state ownership. The second part of the chapter focuses on Hungary and examines how wages change when state-owned companies are privatised. When the buyer is a local company, workers' wages typically decline, while if the buyer is foreign then they tend to go up. In terms of demographic characteristics, the wages of women and younger workers decline least if the

buyer is local, while foreign buyers are much more likely to increase the pay of highly qualified workers.

Chapter 4 (by Miklós Koren and Péter Tóth) examines the impact of international trade on the labour market. The authors compare the wages paid by export and import companies with wages paid by businesses that were not involved in international trade. Both export and import companies paid higher wages than businesses operating on the national market, however the effect is stronger and much greater among import companies. The higher wages paid by export companies can be explained primarily by selection: these businesses had been paying higher wages for years before they started exporting. On the contrary, higher wages paid by import companies increased gradually after they started importing. Nevertheless, not all workers benefited from the growth of trade. The analysis of Hungarian food and textile industries shows that the wages of workers whose production was replaced by imported goods declined compared to non-importing companies. The distribution of wage increases was uneven among workers, the management of the company and highly qualified employees saw higher rises.

Institutional environment of the labour market between September 2010 and August 2011

Possibly the most important change in the institutional environment of the labour market was the entry into force of the new Labour Code, which is discussed in a separate sub-chapter. Nonetheless, there other important changes too. The personal income tax system practically became dual-rate with a lower rate of 16% of the gross wage. At the same time tax credit was completely abolished. From 2012 all forms of early retirement were abolished and this marked the end of a long era that started in the early 1990s – early retirement can no longer be used to ease tensions on the labour market. Existing entitlements continue as non-pension assistance. At the same time public works employment had a further impetus. The new system launched in 2012 offers longer working hours and employment opportunities lasting for months to public workers.

The discussion of the new Labour Code focuses on the main dimensions of labour flexibility. The new law mainly facilitates quantitative changes in the workforce, in terms of labour market transitions (rules on hiring and dismissal) on the one hand, and the performance of existing employees (working time arrangements) on the other. Not only did the conditions of flexibility change but it also became less costly for employers (lower wage supplements, lower cost of dismissal) and even the financial risks associated with employing people (indemnity and guarantees) were reduced. Although the rules of employment outside the scope of the employment contract were simplified, workplace training – crucial for functional flexibility in a modern workplace – is even more marginalised in the new law than it had been before. Despite the fact that the justification of the act stipulates that the legislation would allow a greater scope for collective agreements, overall – through the revised regulation of

local trade unions and collective bargaining – it weakened the bargaining position of local trade unions, particularly in the public sector, often considered the stronghold of trade unions.

2012 was the first year when national wage negotiations were entirely conducted in the new negotiation structure, in which the Government, following consultations with social partners, decides independently on the level of the minimum wage and the minimum wage for skilled workers. Considering wages in public works, a wage-tariff type minimum wage system with four categories continued to exist. The Government also specified the "expected rate of pay increase" for low-paid workers in 2012, and provided incentives through contribution discounts and grant funding for employers implementing the wage compensation. As a result the number and coverage of company-level wage agreements is expected to decline. Although the pay freeze remained in effect in the public sector, the nominal pay of lower paid workers rose due to the wage compensation. There were larger pay increases in the health care sector where new occupational and sectoral pay scales entered into force following the action of junior doctors. A new development in social dialogue was the establishment of a new national forum in the business sector that has fewer partners than its predecessor and lacks legal guarantees in its operation.

Statistical data

This section gives detailed information on the main economic trends, population, labour market participation, employment, unemployment, inactivity, wages, education, labour demand, regional disparities, migration, labour relations and social welfare assistance as well as an international comparison of selected labour market indicators following the structure developed in previous years. As in previous years, additional data related to the topic of *In Focus* is also presented in this section. Tables 12.1–12.4 give information on time span of wage related taxes in Hungary. All tables and figures in this chapter can be downloaded in Excel format following the links provided. All tables with labour market data published in the Hungarian Labour Market Yearbook since 2000 are available for download.

* * *

The editorial board would like to thank staff at the *Institute of Economics – CERS MTA, Hungarian Central Statistical Office,* the *Department of Human Resources Corvinus University of Budapest,* the *National Labour Office,* the *Central Administration of National Pension Insurance,* the *Ministry for National Economy, Ministry of Human Resources,* the *Budapest Institute of Policy Analysis Ltd.,* and the *Magyar Nemzeti Bank* for their help in collating and checking the necessary information and preparing this publication. We would also like to thank the board of the *National Employment Non-Profit Public Company Ltd.* and their experts for comments and recommendations on previous and current volumes and last but not least for supporting financially the publication of the yearbook series.

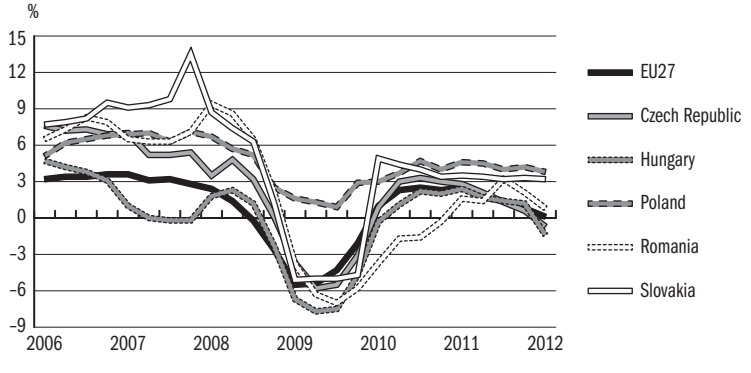
THE HUNGARIAN LABOUR MARKET IN 2011–2012

ZSOMBOR CSERES-GERGELY
GÁBOR KÁTAY
BÉLA SZÖRFI

THE ECONOMIC ENVIRONMENT AND EMPLOYMENT

The global economic recovery that started in the middle of 2009, continued in 2011. The outlook has gradually improved and the majority of the European economies expanded *(Figure 1);* however, budgetary responses to the crisis and the immediate aid to the banking sector have led to a significant hike in debt levels. The European banking crisis gradually transformed into a sovereign debt crisis, affecting mainly Portugal, Ireland, Italy, Greece and Spain, i.e. the peripheral EU member countries. As a consequence, most of the European countries have followed a restrictive fiscal policy; however, initial budgetary positions and the size of the fiscal adjustments differ from country to country. The impact of the budget cuts on aggregate demand and the concerns about the debt crisis weakened confidence in the recovery and the economic outlook has been deteriorating since the beginning of 2011. In the second half of 2011, international economic activity decelerated significantly and at the beginning of 2012 several countries' economic output declined. In early 2012, with uncertainty surrounding the sustainability of sovereign debt levels, the tight credit conditions and the fiscal consolidation measures, economic growth came to a halt in the Eurozone, while data on industrial production point towards a recession. Hungary's most important trade partner, Germany – despite the slowdown of the Eurozone – is likely to maintain its higher growth rate. However, in line with the global debt deleveraging, the engine of growth may shift from exports to domestic consumption, which could affect the Central and Eastern European region's export demand negatively (*MNB,* 2012a).

Figure 1: GDP-growth in the region, annual change (%)



Source: *Eurostat*.

In line with the economic performance of their European trade partners, the economic growth of the countries in the Central and Eastern European region gained momentum in the first half of 2011, but is still below the pre-crisis growth rates. Debt deleveraging of Hungary and Romania, countries which were characterised by severe indebtedness prior to the crisis, was stronger and as a consequence, domestic demand and economic growth was lower than that of other countries in the region. The growth rate in the Czech Republic has been gradually deteriorating in the last two years due to declining domestic demand and fiscal consolidation measures; the economy even declined in early 2012. In Poland, the least open economy in the region, therefore the least exposed to fluctuations in foreign demand, domestic demand is able to positively contribute to growth, which is also due to a lower level of household indebtedness. Therefore, Poland is the most dynamic country of the region; however, the growth rate lags behind its pre-crisis level. With the introduction of the single currency in 2009, Slovakia avoided problems arising from foreign currency lending, while the structure and scale of the car industry supported the rapid recovery.

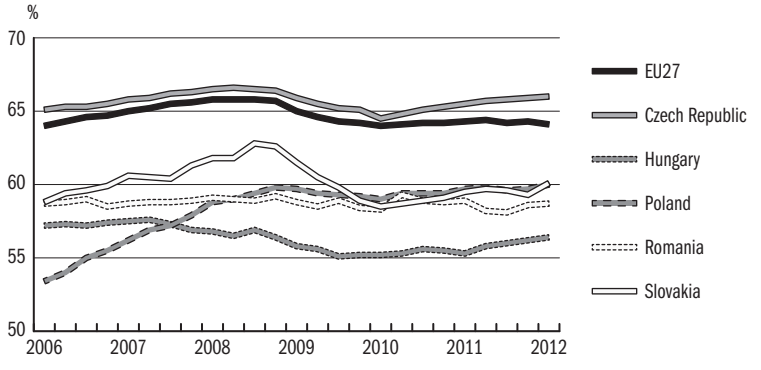
In Hungary, the outbreak of the crisis hit the exporting sector the hardest in the short run, but as external demand picked-up in 2009 and 2010, this sector's recovery launched first. With high debt levels accumulated earlier, the consumption and the investment of households declined. In the course of firms' adjustment, falling real wages and rising unemployment lowered disposable income. Meanwhile, the exchange rate, weaker as it was than prior to the crisis, raised the payments of households with foreign exchange denominated debt. As a consequence of these factors, domestic demand permanently fell back: consumption has been stagnating even in 2012 and investments decreased further. As a result, the output of firms producing for the domestic market still lags behind its pre-crisis trend.

Labour demand is subdued in all countries of the region. Labour hoarding characterised all countries to a greater or lesser extent: firms laid off less workers than would follow from the drop of output and tried to reserve the more skilled and more productive workers. This practice was supported in several countries by government programs: firms received support if they committed to keeping their employees. During the recovery, firms previously hoarding labour increased their labour demand more slowly, while using the existing labour force more intensively. As a result, employment rates in the Central and Eastern European region as well as in the whole of the EU lag behind their per-crisis levels. The only exception is Poland where economic activity did not fall and is still relatively dynamic. In Hungary, the employment rate is still behind its 2005–2006 level, in spite of the fact that intensifying public working schemes counterbalanced the drop in private sector employment to a large extent *(Figure 2)*.

Over crisis periods, labour supply might be influenced by two counteracting cyclical phenomena. On the one hand, facing permanently low labour demand, those who lose their jobs may give up job search after a while and exit the labour

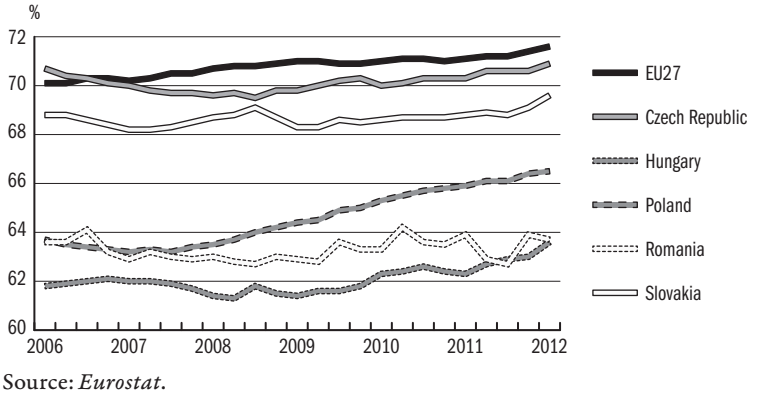
market. This in turn decreases the participation rate. On the other hand, in order to substitute for the absent income of the household, previously inactive secondary earners of a household might return to the labour market as the primary earners lose their job. In Hungary and Poland, structural measures also contributed to the rise in the participation rate: both countries tightened the conditions of retirement; Hungary in addition applies stricter conditions to disability pensions and also revises the status of the current disability pensioners. In Poland, those who were born in the baby boom of the early eighties are just entering the labour market (*OECD,* 2012).

Figure 2: Employment rates in the Central and Eastern European region (15 to 64 age group, percent)



Source: *Eurostat.*

Figure 3: Participation rates in the Central and Eastern European region (15 to 64 age group, percent)



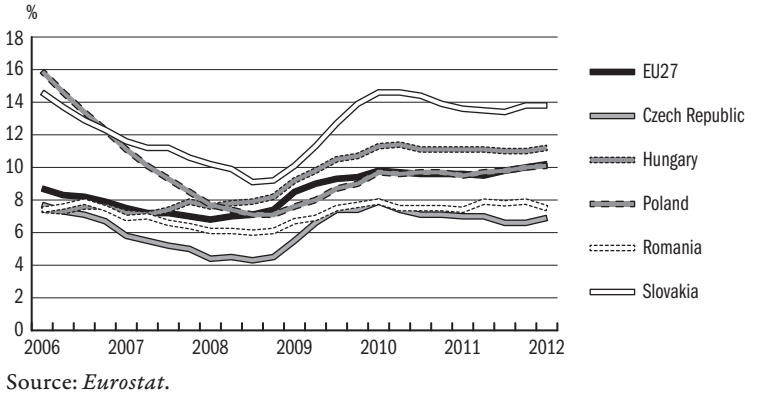
Source: *Eurostat*.

Due to the large or increasing labour supply and subdued labour demand, unemployment rates across Europe rose and continued increasing even after the recovery started. High unemployment is noticeable in the Southern European countries with the most severe debt problems, but the rates are also close to levels around the early nineties' transition period in the Central and Eastern European

economies. The prolonged crisis also leads to a permanent fall in labour demand, and as a result, the job finding probabilities of the unemployed remain low. As a consequence, the number of long-term unemployed, i.e. those who have been looking for a job for more than one year, also rises. In the case of the long-term unemployed, there is a risk that they lose their skills and competencies and will not be able to find a job even when the crisis is over. This increases the equilibrium unemployment rate as well (see e.g. *Ball*, 2009).

Hungary differs considerably from the other countries of the region in a sense that in the past few years, a significant positive labour supply and negative labour demand shocks have been prevailing at the same time. Labour supply increases as an effect of tightening conditions of disability pensions, and as a result by early 2012, the participation rate increased to a level not seen since the transition. Economic restructuring in the 2000s (depression of textile industry and construction, upswing of manufacturing) and weak economic activity since the outbreak of the crisis, caused a shift and then a fall in labour demand. As a consequence, the unemployment rate has been continuously increasing since the middle of the 2000s *(Figure 4).* The issue of unemployment was deepened further by the crisis, and as a result – despite the intense public working scheme programs –, since 2009 Hungary has the second highest unemployment rate in the region behind that of Slovakia.

Figure 4: Unemployment rate in the Central and Eastern European region (15 to 64 age group, percent)



Source: *Eurostat*.

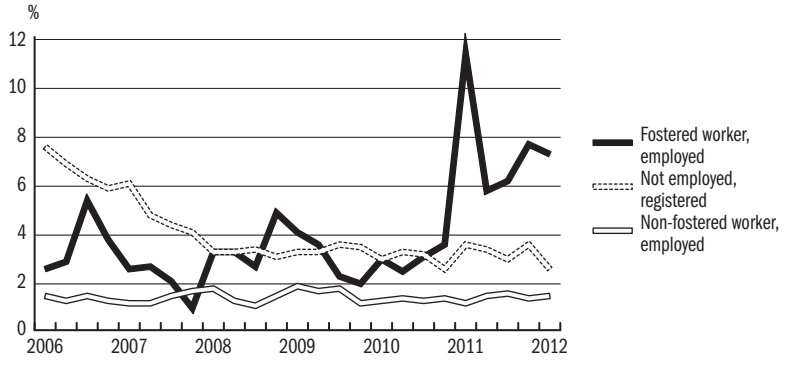
In the following chapters, we introduce the labour demand and supply shocks, and additionally the analysis is also extended to wage developments.

LABOUR SUPPLY

The increase in the participation rate has gained new momentum over recent years. By early 2012, the participation rate of the 15 to 64 age group almost reached 64 percent, a value last seen in early 1993. By decomposing the change in participa-

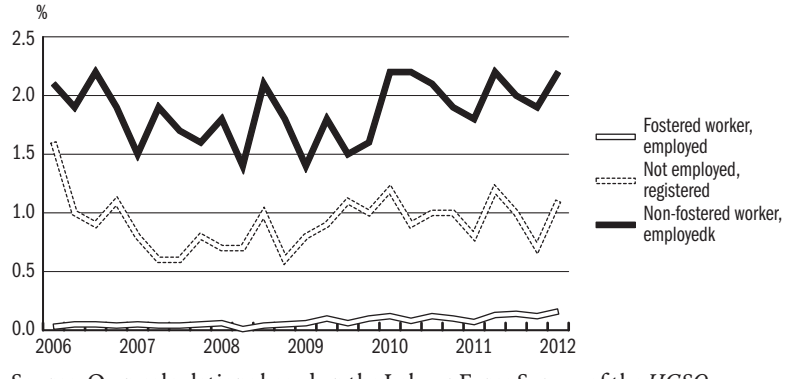
tion using the method of *Kátay and Nobilis* (2009), it is evident that since 2009, the rise in participation was mainly caused by a severity of social transfers and by change in the composition of the active population. During the crisis, the residual component – which mainly contains the cyclical component of labour market participation – contributed negatively to participation. According to data on flows between different groups, the flow directly from employment rather than from unemployment into inactivity strengthened *(Figure 5)*. The sharp rise in the flow from subsidised employment into inactivity might be a consequence of the restructuring of the public working schemes. Those who temporarily lost their fostered worker status in the 2011 short term programs and were not working and seeking for another job during the period in which they were waiting to be placed into the program again, were counted as inactive according to the ILO methodology *(Figure 6)*.

Figure 5: Inflow rates into inactivity



Note: Public workers include all types of subsidised public workers and not only fostered workers.
Source: Own calculations based on the Labour Force Survey of the *HCSO*.

Figure 6: Outflow rate from inactivity

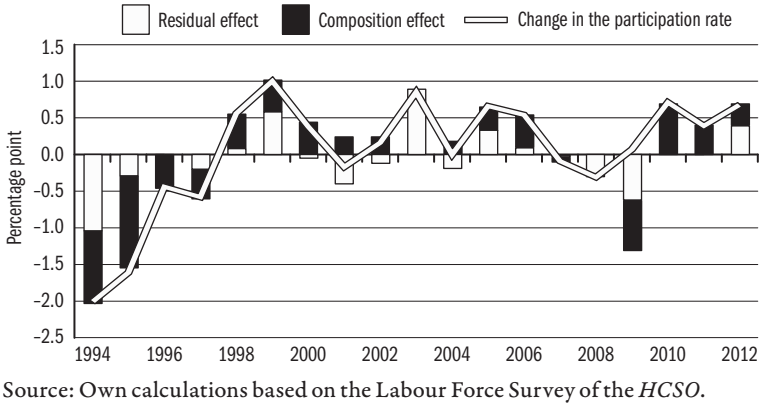


Source: Own calculations based on the Labour Force Survey of the *HCSO*.

In recent years, demographic developments also decreased participation: the so called Ratkó-children are now reaching retirement age and their outflow from the labour market might have already begun. In the short run, the effect of schooling and education offset each other. Since the early 2000s, more and more individuals extend their studies and this temporarily decreases participation. However, after completing school, the higher educational level leads to a higher participation in the long run. It is worth noting that the change in the educational level changes participation only over a limited horizon. According to *Hermann and Varga* (2012), the change in the average educational level slowed down over the past two years and they forecast that until the end of the decade its growth will be even slower, and it is likely that education will contribute less to the rise in participation. However, a more favourable average level of education increases the participation rate permanently.

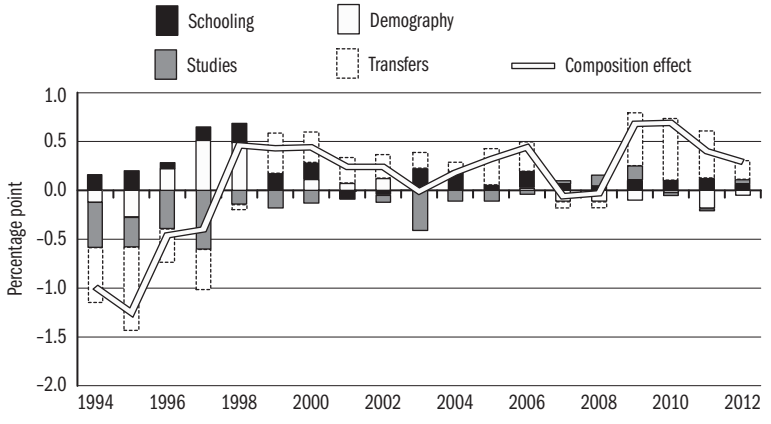
Since the early 2000s, the continuous severity of social transfers affected participation positively, and this process accelerated considerably since 2008, the reasons being the rise in the retirement age and the restrictions of entitlement for disability pensions. According to flow data, the rise in activity is due to the fact that while in 2006, 6–7 percent of the unemployed became inactive, this rate decreased to 3 percent by the end of 2008. In spite of the intention of the government, outflow from inactivity into activity has not yet changed considerably; restrictions of entitlement for disability pensions only resulted in a slowdown of inflow into inactivity. It is worth noting that with the restructuring of the public working programs towards a shortened period and part-time employment, a large number of fostered workers flow into inactivity. The reason might be that fostered workers knew that within a short period of time, they would become employed again in the program, and they neither worked nor searched actively for jobs whilst being temporarily inactive. Due to the methodology of the Labour Force Survey, they are considered as inactive. *Figures 7–9* present the decomposition of the change in activity.

Figure 7: Decomposition of the change in the participation rate



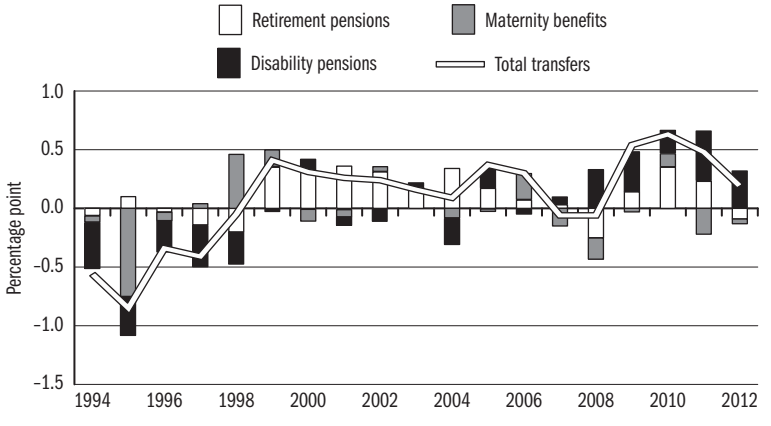
Source: Own calculations based on the Labour Force Survey of the *HCSO*.

Figure 8: Decomposition of the composition effect



Source: Own calculations based on the Labour Force Survey of the *HCSO*.

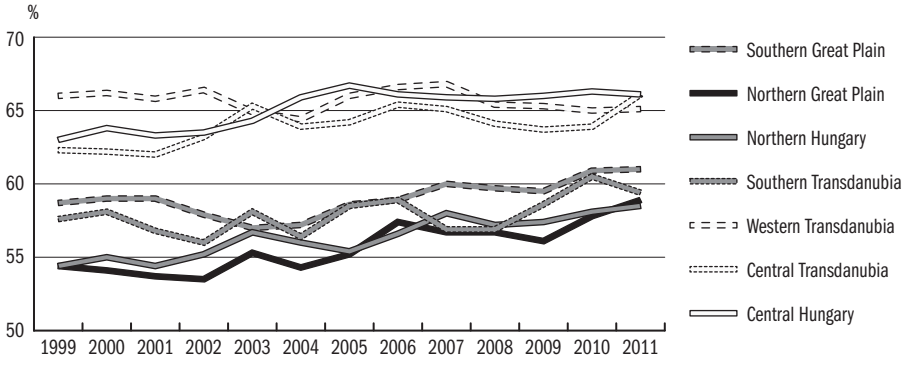
Figure 9: Decomposition of the transfer-effect



Source: Own calculations based on the Labour Force Survey of the *HCSO*.

Developments in the participation rate are rather heterogeneous amongst the regions *(Figure 10)*. In the regions with the highest 65–66 percent participation rates amongst the 15 to 64 age group – Central Hungary and Southern Transdanubia – participation did not increase in recent years. The aggregate increase in the participation is due to the rise in the labour supply in those regions with less favourable conditions. In 2011, the number of inactive persons rose considerably in the Southern Transdanubian region, which might be the consequence of the restructuring of the public working schemes. Southern Transdanubia had the most fostered workers in 2010 and flow data indicate a large outflow from public work into inactivity.

Figure 10: Participation rates in the Hungarian regions (15 to 64 age group, percent)



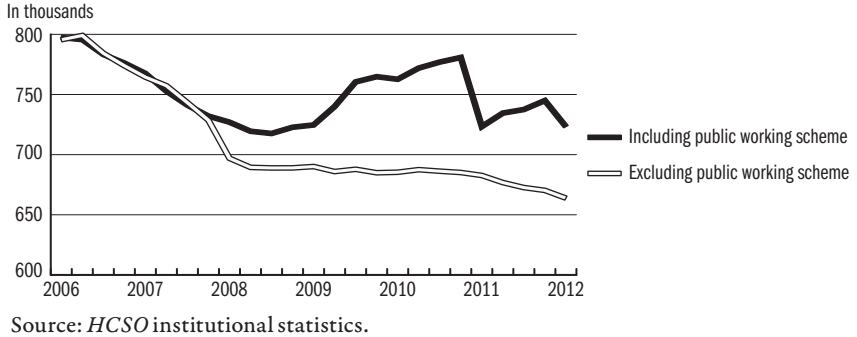
Source: Labour Force Survey of the *HCSO; MNB*.

LABOUR DEMAND

In Hungary, employment had already started to decline in early 2007, prior to the crisis. Taking this fact into account, by mid-2009, at the trough of the crisis, output had fallen more than employment, as firms hoarded labour, i.e. tried not to lay off their more productive and more skilled workers. The reason behind labour hoarding might be that firms projected the fall in demand to be only temporary and tried to save on hiring and firing costs, especially of skilled workers who are more difficult to find on the labour market. In 2009, labour hoarding, part-time employment and training was also subsidised by the government.

Labour demand in the public sector was influenced by two factors. Debt accumulated earlier and the aim to fulfil deficit targets made it necessary to rationalise public sector employment *(Figure 11)*. As a consequence, the number of public and civil servants has been continuously decreasing since the outbreak of the crisis.

Figure 11: Employment in the public sector (thousand persons)



Source: *HCSO* institutional statistics.

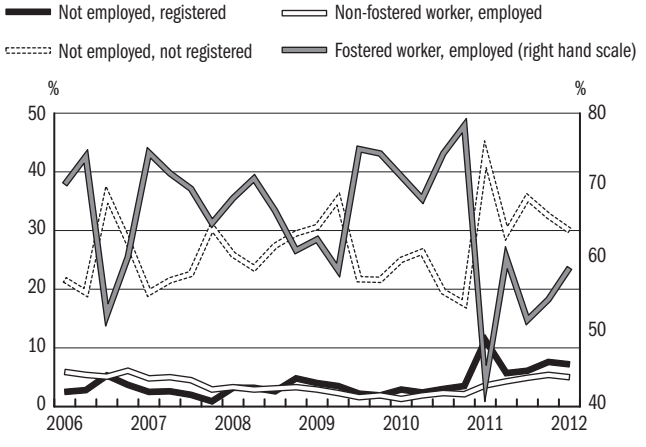
In line with the above, public working schemes gained importance. The public working program of 2011, which replaced the "Pathway to work" program of 2009, unified the former three types of community work. The new program of-

fered employment for a short period, in general for 2–4 months and typically part time. The social benefits related to the programs were also modified. During 2011, about 300 thousand persons were involved in the restructured programs and the highest number of workers employed at any one time was about 70–80 thousand.

In 2012, the programs changed again. More emphasis was put on full time employment and the average duration of employment increased to eight months. The government calculates that in 2012, about 200 thousand persons are involved in the programs, while the number of those employed at the same time exceeded 100 thousand by the middle of the year.

According to the flow data of the Labour Force Survey of the HCSO, the number of permanent fostered workers is considerable. Those who exit community work, mostly become fostered workers again or turn into unemployed; however, from 2011, the number of those leaving the labour market also increased – presumably only temporarily until they get back into the program. It is favourable that about 5 percent of the fostered workers are able to find a job outside of the programs. This ratio is similar to the one observed in the early 2000s, but includes many more people given the nature of the current programs. As labour demand improves, a rise in this job finding rate can be expected, thus the programs become of significant importance *(Figures 12–13)*.

Figure 12: Outflow rate from community working

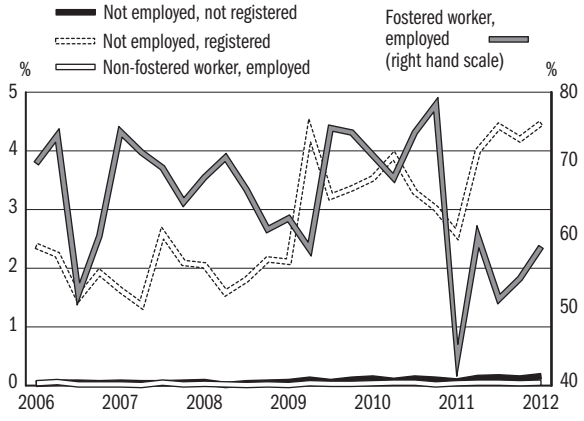


Source: Labour Force Survey of the *HCSO*, own calculations.

The labour demand of the private sector can be characterised by the same heterogeneity as economic developments. In line with the recovery from the crisis, manufacturing firms affected positively by the rebound of external demand started to expand their employment. Several one-off investments, mainly in the automotive industry (the establishing of the Mercedes factory, expansion of Audi, Opel and Hankook) contributed to this development, which working through the supply chain could also have had a positive effect on the labour demand of smaller

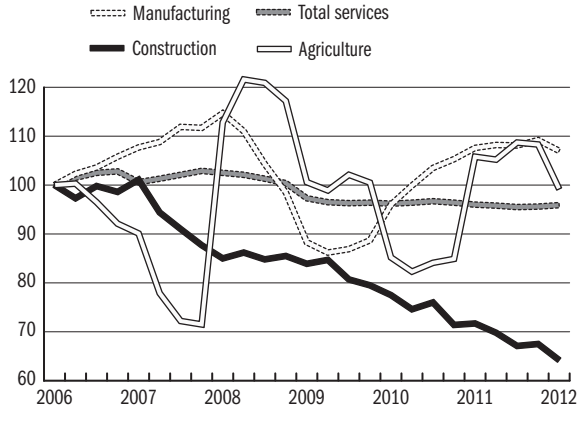
manufacturing firms. Employment in those market services closely related to domestic demand is stagnating and some improvement can only be observed in tourism and in transport. The decline in construction has been continuous and as a result, the number of those employed in this area decreased considerably. The number of those employed in agriculture is on the other hand increasing, and the earlier downward trend in the ratio of employed in agriculture to the total private sector employment seems to have reverted *(Figure 14)*.

Figure 13: Inflow rate into community working



Source: Labour Force Survey of the *HCSO*, own calculations.

Figure 14: Value added in different branches of the economy (2006 Q1 = 100)

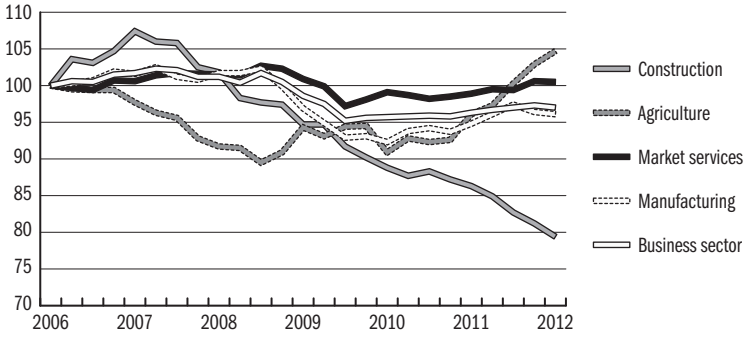


Source: *HCSO*.

According to the institutional statistics employment in the private sector decreased sharply in early 2012 by about 30 thousand persons *(Figure 15)*. The National Bank of Hungary (NBH) pointed out in its analysis that the sharp fall in employment affected firms with less than 50 employees, while employment amongst firms with more than 50 employees diminished only moderately

(*MNB,* 2012a). Looking at disaggregated data, the fall in employment seem to be independent of the wage developments of early 2012, thus it is unlikely that the rise in the minimum wage caused sudden lay-offs. The NBH shows that the presented fall in employment might cover the annual change in the sample of firms with 5–49 employees in the HCSO's institutional statistics. This does not mean that the fall in employment is not a real development; it rather implies that smaller firms in the private sector might have already decreased their employment in 2011. However due to statistical properties, the fall in employment appeared suddenly in the statistics.

Figure 15: Employment in the private sector (2006 Q1 = 100)



Source: Institutional statistics of the *HCSO*.

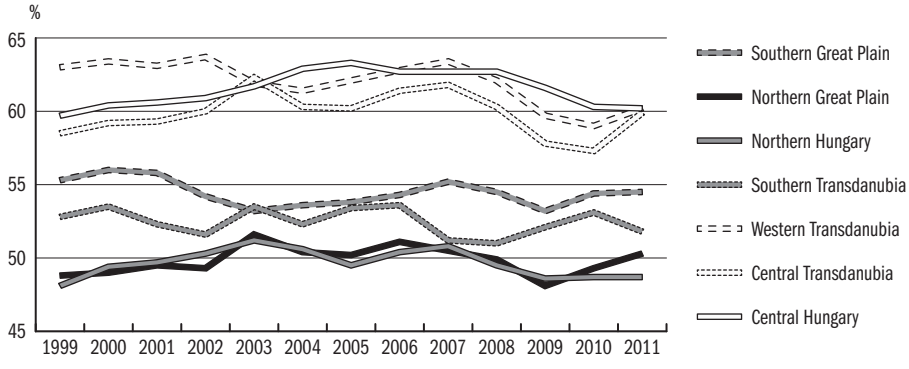
Data from the Labour Force Survey of the HCSO show a somewhat different picture. Total employment has been increasing since the trough of the crises in 2009, and according to the LFS data, this was not only caused by the public working schemes but also by private sector employment. The difference in the two statistics can be explained by the fact that the LFS also covers firms with less than 5 employees, self-employed persons and those employed in the grey economy. Besides, developments in the LFS-employment generally lag behind economic developments and the changes in employment in the institutional statistics. As a consequence, it is possible that the rise in the LFS employment is a result of the recovery of 2009 and 2010 and does not reflect a deteriorating economic outlook of the second half of 2011 (*MNB,* 2012b).

As a consequence of the crisis, falling labour demand affected all regions of Hungary *(Figure 16).* However the employment rate decreased the most in the most developed regions. Public working schemes concentrating on less developed regions with less favourable employment rates contributed to more favourable employment trends in these regions.

Since early 2010, the size of mass lay-offs fell back to its pre-crisis level. However, at the end of 2011 – early 2012, bankruptcy and a cut-back in the production capacities of some large firms (Malév, Budapest Airport, Nokia) led to significant mass lay-offs. The number of non-subsidised vacancies increased somewhat in

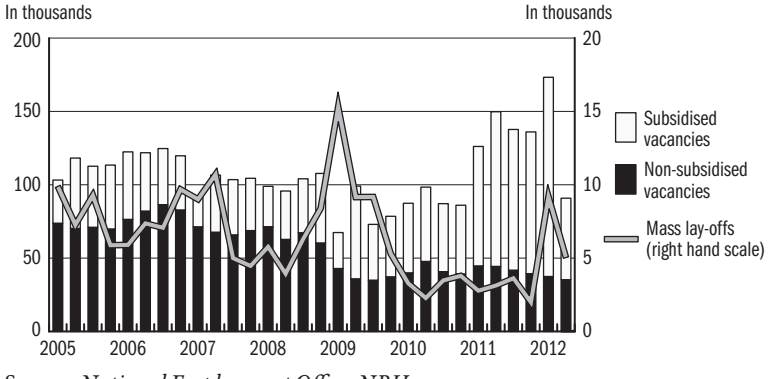
2010; however from mid-2011, as the economic outlook worsened, the labour demand of firms once again started to decrease *(Figure 17).* By early 2012, the vacancy inflow fell back to a level experienced at the trough of the crisis. Meanwhile, despite the public working programs, the number of unemployed did not diminish. As a result of the two, the Beveridge-curve – based on the relationship between vacancies and unemployment – shifted inwards *(Figure 18).*

Figure 16: Employment rates in the Hungarian regions (percent)



Source: Labour Force Survey of the *HCSO*.

Figure 17: Developments in mass lay-offs and vacancies

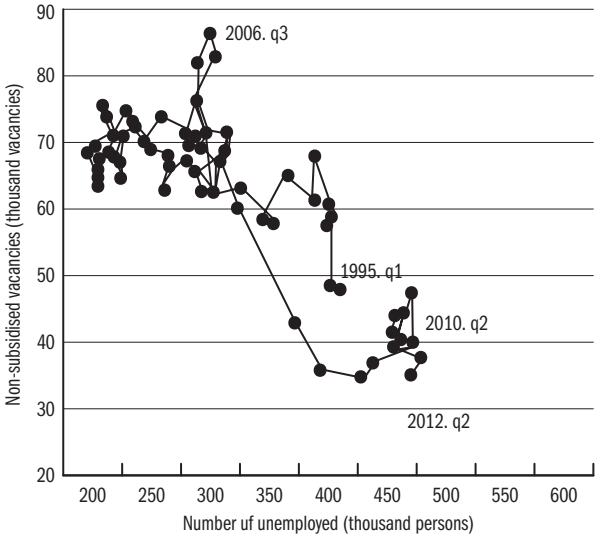


Source: *National Employment Office, NBH.*

According to labour theory, if a negative cyclical productivity shock hits the economy, the Beveridge-curve first shifts towards the origin (the number of newly posted vacancies are not increasing, but unemployment still does not increase either), then we move downward along the curve (the number of vacancies is decreasing while unemployment is increasing – see the period 2008–2009). Positive productivity shocks result in the opposite (see 2009 and the first half of 2010). The shift of the curve towards the origin might be also a sign of unfavourable structural processes, when the number of vacancies and labour demand decrease permanently and unemployment also stays permanently high. It is hard to tell

yet if developments in 2011–2012 are of cyclical or structural origin, nevertheless, the Beveridge-curve signals unfavourable developments (see e.g. *Mortensen and Pissarides,* 1994, *Shimer,* 2000).

Figure 18: The Beveridge-curve



Source: *National Employment Office, NBH.*

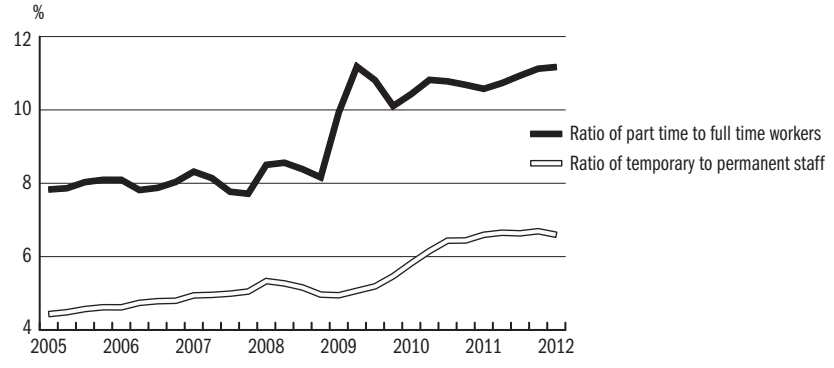
Besides the developments in non-subsidised vacancies, more factors indicate that labour demand is not only low because of cyclical reasons but also has fallen back permanently. The decline of construction has been present for years and no reversal can be seen so far (see *Figure 14*). Corporate investment rates are remarkably low, which means that no future production capacities are being built up. More average-sized companies disappear than are born. The permanent decrease in labour demand in line with the rise in trend labour supply implies that the unemployment rate might remain high for an extended period and an improvement can be only brought about by the public working programs (*MNB,* 2012b).

The outbreak of the crisis reinforced atypical employment. Part-time employment spread first in manufacturing but then grew dynamically in market services as well. According to the institutional statistics, amongst firms with more than 5 employees, the ratio of part-time employment in the total employment figure rose from 8 percent prior to the crisis to above 11 percent by early 2012 *(Figure 19)*.

Temporary staffing has become more and more popular: amongst firms with more than 5 employees the ratio of temporary staff increased to above 7 percent by 2011. According to the 2012 publication of the National Employment Office, more than 7 thousand firms contracted with companies which offer temporary staffing, 3,900 of them operating in manufacturing. The average number of temporary staff at companies was 16; temporary staffing was the most intense in the

Eastern part of the country: in Szabolcs-Szatmár-Bereg, temporary staff reached 146 persons per company on average. In 2011, about 111 thousand employees had legal contracts with companies organising temporary staffing; however, only one third of them was actually hired at the same time. About two thirds of the employees were hired in manufacturing. Within market services, information and communication technologies (5.8 percent) and administrative services (4.9 percent) used temporary staffing intensively as means of hiring (*NSZF,* 2012b).

Figure 19: The ratio of part time workers and temporary staff in full time employment



Source: *HCSO* institutional statistics.

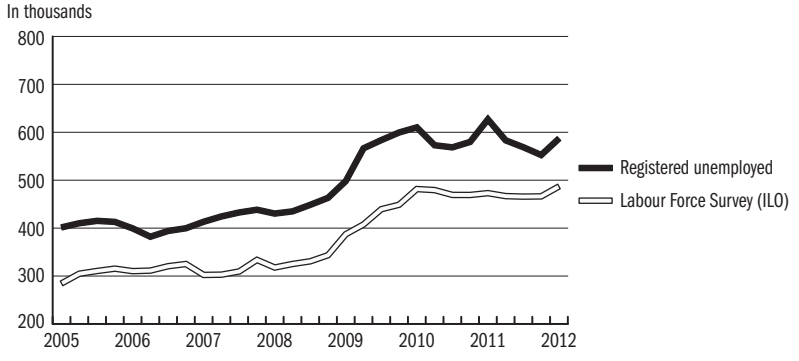
Since 2011, companies offering temporary staffing have the opportunity to place fostered workers into private companies. The opportunity has not been taken advantage of so far: only five companies have gained the permit, but none of them mediated fostered workers (*NSZF,* 2012b).

UNEMPLOYMENT

As a result of increasing labour supply in recent years and of the falling labour demand during the crisis, the unemployment rate as defined by the ILO rose steeply to 11% in 2008 and 2009, and has not diminished since. *(Figure 20)*. As a result of government policies to expand participation, less and less unemployed leave the labour market, and in turn, public working schemes only hinder the rise in unemployment, but fail to lower it.

The number of registered unemployed rose similarly to the number of unemployed in the HCSO's Labour Force Survey; however, the former proved to be more volatile. With the annual restructuring of the public working schemes, the number of fostered workers drops to its lowest in the first months of the year, while the previous fostered workers re-registered at the labour offices, which in turn leads to an increase in the number of unemployed. By the middle of the year, as public working schemes wind down, the number of registered unemployed drops again.

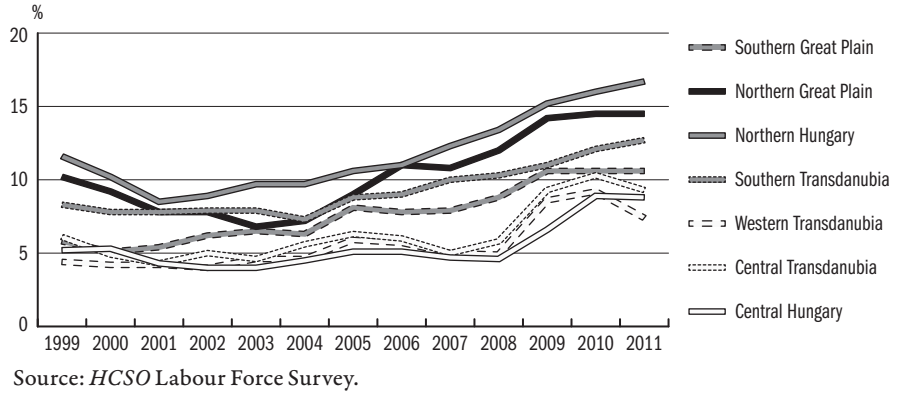
Figure 20: The number of registered and ILO-unemployed



Source: *National Employment Office; HCSO* Labour Force Survey.

Although with significant differences, the unemployment rate increased in all regions *(Figure 21)*. Prior to the crisis, Central Hungary had the lowest unemployment rate (4–5%), but the rate rose sharply in 2009 and is still stuck around 6–7%. In the central region, the underlying reason for the non-decreasing unemployment – despite the economic recovery – is the fact that the number of public – but not fostered – workers is the highest in the capital and the lay-offs in public administration affected this region the most. In Western and Central Transdanubia – due to the geographical concentration of the car and manufacturing industry – unemployment rose rapidly from 6–7% in 2008 to nearly 10%; however, with the fast recovery of the industry, unemployment decreased in 2011. In the Southern Great Plain, Southern Transdanubia, and in the regions with the highest unemployment – the Northern Great Plain and Northern Hungary, unemployment rates have been increasing since the early 2000s, which was reinforced by the outbreak of the crisis. Since 2010, public working schemes focused on these regions; however, as labour market participation was also increasing, the unemployment rate could not diminish and even increased in Northern Hungary and Southern Transdanubia.

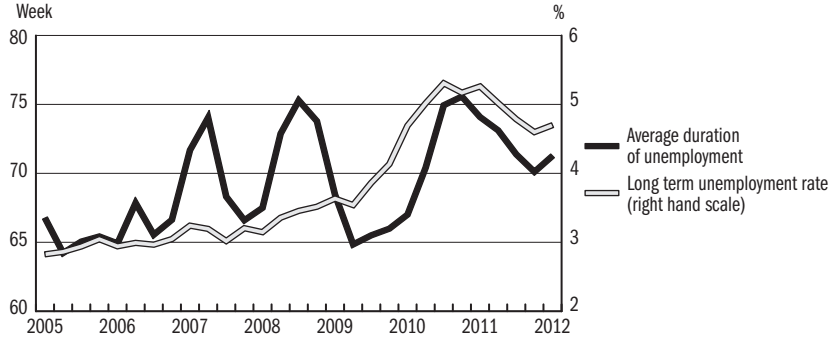
Figure 21: Unemployment rate in the Hungarian regions



Source: *HCSO* Labour Force Survey.

As the fall in labour demand proved to be permanent, the long-term unemployment rate has also been continuously increasing. In 2011, the number of long-term unemployed dropped, which was due to the nature of the public working programs, since the long-term unemployed entered the short-term programs. In 2012, as the programs were again restructured, the number of unemployed involved in the programs dropped by about a hundred thousand and those losing the opportunity to participate in these programs have even less chances to find jobs in the private sector. As a consequence, long term unemployment has been rising again since the beginning of 2012. The duration of unemployment showed an increasing trend even before the crisis, while the crisis first shortened duration as the inflow into unemployed status intensified. By 2011, the duration of unemployment increased significantly, signalling that those who lost their job during the crisis are not able to find a job for an extended period. In 2011, due to the short term community work programs that involved a large number of unemployed, duration fell *(Figure 22)*.

Figure 22: Average duration of unemployment and the long-term unemployment rate



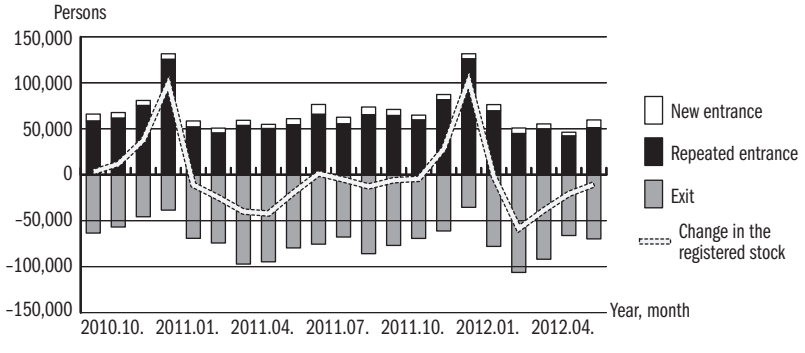
Source: *HCSO* Labour Force Survey.

One of the most important changes of 2011 was the change in unemployment benefits. The effect of these changes on unemployment is less well known today. Before September 2011, the registered unemployed were entitled to a job seeker's allowance for 270 days, then for another 90 days (in the case of the unemployed above age 50 for 180 days) to job seeker's assistance. Then the current form of social care and public working scheme commenced. Since September 2011, the unemployed are entitled to job seeker's allowance only for three months, while unemployment benefit is only available for unemployed persons not more than 5 years younger than the retirement age. After this point, the unemployed must participate in either the public working scheme or in active labour market programs in order not to lose the entitlement to future unemployment benefits. Thus changes in the regulation did not only cover the duration of benefits but also the period after the benefits expire and the conditions of the benefits.

The narrowing conditions of unemployment benefits might affect unemployment through several channels. The shortening of the period covered unconditionally and spent on job search might deteriorate the chances of job finding; on the other hand, this could be offset by the cut in the benefits. Not only the duration of job search, but also the quality of the job obtained might change. If the duration of job search is shorter, there are higher chances that the unemployed person would take up a job with a salary less than optimal or with worse working conditions. Finally, the change in the complete unemployment benefit system might have selection effects. If job seekers are almost certain that they will not receive any help in the job search during the registration period, are entitled to low benefits and do not want to participate in the public work programs, it can happen that they do not want to register at the labour offices at all.

Figure 23 again illustrates the fact that the yearly average stock of the registered unemployed stabilised around 580 thousand persons after 2010. Within the year, this number varies due to the winding up or down of the public working programs and the inflow into, and outflow from, the stock of registered unemployment.

Figure 23: The number of registered unemployed (persons, monthly data)

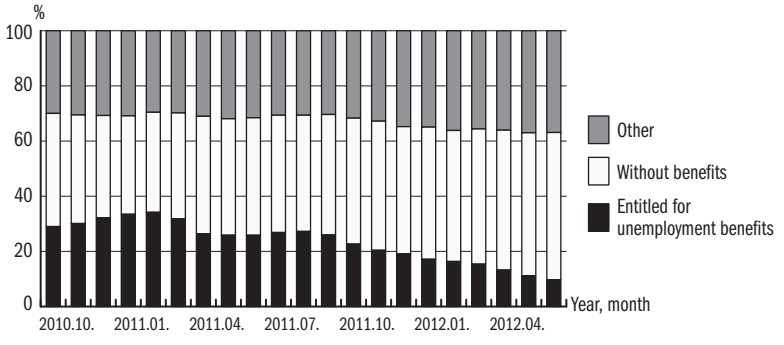


Source: *National Employment Office*.

As the figure shows, the changes in the number of unemployed cover the inflow of unemployed who were already registered at the National Employment Office previously (although not necessarily shortly before the re-registration), while the ratio of the new entrants is low. There is a noticeable correlation between the change in the stock of the registered unemployed and the duration of the registration. However, due to the lack of micro data, one cannot draw safe conclusions based on this correlation, as fostered employment breaks the continuity of the registration and restarts the calculation of the duration. After September 2011, none of the indicators show noticeable changes in the developments observed earlier. The outflow as a ratio of the total stock increases every month when compared to the previous year, this does include several effects though.

The effects of the above mentioned changes are better reflected in the data on the ratio of those unemployed who receive unemployment benefits. As *Figure 24* shows, this ratio was earlier well above 20 percent (and even reached 30 percent in early 2011), but decreased to 10 percent by the summer of 2012. Although the decrease affected mainly those without any benefits, the ratio of those who receive other kinds of social care also decreased.

Figure 24: The distribution of registered unemployed by the type of entitlement (per cent, monthly data)

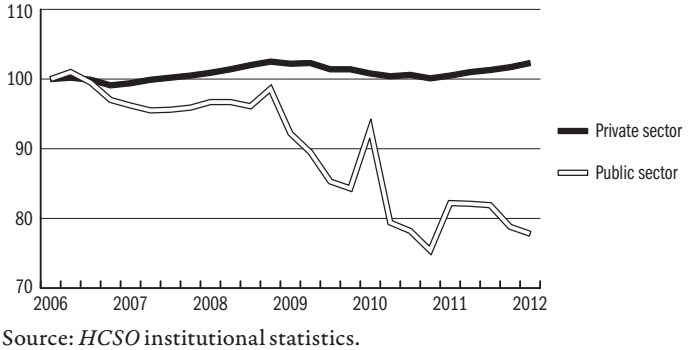


Source: *National Employment Office*.

WAGES AND EARNINGS

The outbreak of the financial crisis also broke the previously high nominal wage dynamics. Real wages also decreased in the total economy; however, different branches of the economy experienced heterogeneous wage dynamics. In the public sector, wage adjustment has been stronger as real wages have been falling continuously since the outbreak of the crisis. Real wages in the private sector though did not diminish when compared to their pre-crisis levels *(Figure 25)*.

Figure 25: Gross real wages (2006 Q1 = 100)

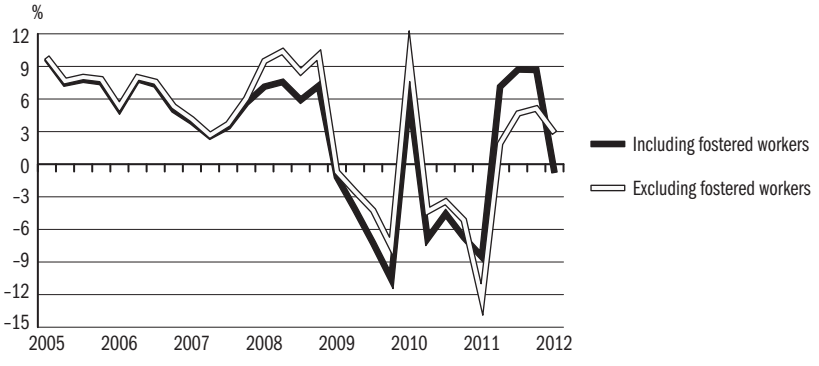


Source: *HCSO* institutional statistics.

In order to comply with fiscal deficit targets, the public sector was forced to set back wage costs strongly. Disregarding fostered workers, public employment di-

minished and nominal wages have been practically unchanged since 2008. As a consequence, by early 2012, real wages fell by about 25 percent when compared to 2007 *(Figure 25)*. Data on nominal gross wages are biased by the restructuring of the public working scheme in 2011. Institutional statistics measures the average wages of full-time workers and in 2011, a large number of low income fostered workers fell out of the sample of the statistics, causing an upward bias in the public sector average wages. Disregarding fostered workers, a one-off completion of public workers' earnings in 2010 led to a somewhat higher wage index, but in general, wage dynamics in the public sector were significantly lower than in the private sector *(Figure 26)*.

Figure 26: Gross wages in the public sector with and without fostered workers (year-on-year change, percent)

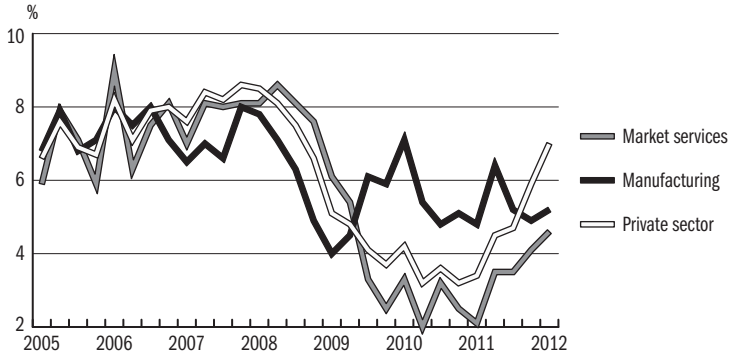


Source: *HCSO* institutional statistics.

Given the slack labour market, nominal wage dynamics in the private sector have been more moderate since the outbreak of the crisis than they were before. As opposed to the public sector, gross nominal wages proved to be rigid and they did not decrease. In 2011 and 2012, gross wages were also influenced by changes in personal income taxation.

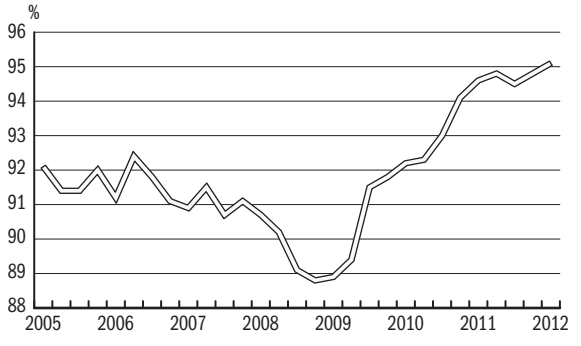
Broadening labour supply in the past few years *ceteris paribus* would put a downward pressure on wage dynamics; however, this process evolves only over the long run. After the moderation of the wage index during the crisis, an improving economic outlook in 2010 accelerated wages. The dual structure of the recovery from the crisis is reflected also in wages. Wages in the relatively well performing manufacturing sector accelerated in line with the improving productivity. In market services, wage dynamics remained at historically low levels until the first half of 2011 and only accelerated somewhat in the second half of the year *(Figure 27)*. Due to the sharpening heterogeneity in the structure of economic developments, average wage level in manufacturing has been converging to the average wages in market services *(Figure 28)*.

Figure 27: Gross average wages in the private sector (year-on-year change, percent)



Source: *HCSO* institutional statistics.

Figure 28: The ratio of wages in manufacturing to wages in market services



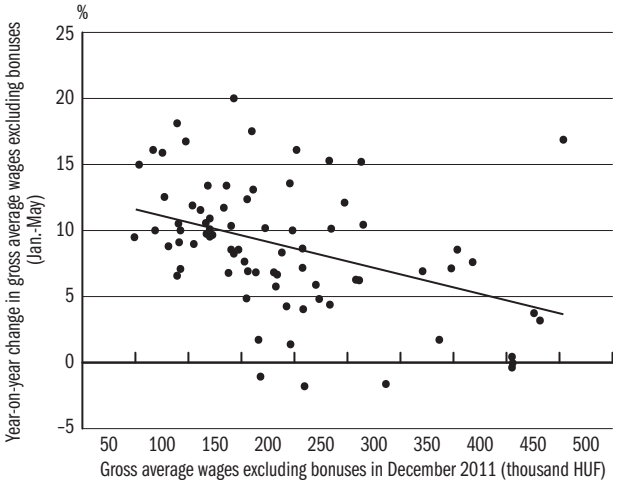
Source: *HCSO* institutional statistics.

In 2011, the government introduced tax allowances for families as well as a flat tax rate of 16 percent. However, the 27 percent grossed up tax rate remained leaving the effective tax rate at 20.3 percent. The tax deduction of the lower income workers also stayed in effect, but was decreased. The pension contribution of the employees was also raised. These changes in the taxation system diminished the tax burden of families with more than one child and those above the average wage, while increased the tax burden of those without children or below the average wage. According to economic theory, a decrease in the taxes of the high-income workers would lead to an increase in their supply of labour and thus a decrease in gross wages. However, according to disaggregated statistics this did not happen in 2011: wage increases in economic branches with a higher average wage were only slightly below increases in low-wage branches. There might be several reasons behind the lack of wage moderation. It could happen that firms used the decrease in taxation to whiten "wages" paid: actually paid gross wages did not change or even diminish, but firms declared higher gross wages. Due to the decrease in income taxes, net wages of the employed would be able to increase even with unchanged or diminished gross wages. The lack of

moderation could also be a sign of significant structural mismatches between labour demand and supply. During the crisis and the recovery, labour demand of the firms was shifted towards more skilled workers who in general demand higher wages. As the recovery from the crisis began, most skilled workers were the first to be able to find jobs and later on, firms were less able to find skilled workers. Based on these observations, the labour market might be tighter than suggested by the common indictors of tightness, which would explain higher wage dynamics (*MNB,* 2012a).

In 2012, personal income taxation changed again. Tax deduction was abolished, and the grossed up tax base was also erased up to about the average wage. In practice this means a two bracket tax system with tax rates of 16 percent and 20.3 percent. As the abolition of tax deduction would have considerably decreased the net wages of low-income workers, the government increased minimum wages by 20 percent and announced a system of "expected" wage increases. Firms that raise wages as expected by the government and meet the supplementary conditions could apply for a wage compensation covering the rise in wage costs.

Figure 29: The level and change of wages in the private sector



Source: *HCSO* institutional statistics.

As presented in *Figure 29*, due to the administrative measures of the government, gross wages in the private sector increased by nearly 10 percent when compared to the previous year. In line with the rise in the minimum wage and the system of the "expected" wage increases, gross wages of low-income workers increased the most, while wage increases amongst high-income workers – affected positively by the changes in taxation – were more moderate. The 5–6 percent rise in gross wages of high-income workers can still be considered as high, especially when one takes into account that tax changes in 2012 favoured employees with

higher than average wages. There is still little information on the reasons for this considerable increase in gross wages; besides structural mismatches, high inflation expectations also might have played a role.

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IN FOCUS – I
TAXES, TRANSFERS AND THE LABOUR MARKET

Edited by
PÉTER BENCZÚR

EDITOR'S FOREWORD

PÉTER BENCZÚR

My 2007 review article in the *Hungarian Review of Economics* started with the following words: "Our recent and distant past is rich in hot debates about the macroeconomic impact, budget revenue implication, or social desirability of various tax, social contribution or transfer reforms. This is natural, and not specific to Hungary. One crucial element, however, is usually missing from these often fierce debates: the objective quantification of the particular reform's detailed impact on household and corporate behaviour. This would involve drawing lessons from past events and assessing the likely impacts of current reforms. It is usually the former that creates the opportunity for the latter." (*Benczúr,* 2007, p. 125.)

Since then, this research program has generated many new results, viewpoints and interesting debates: building on the rich heritage of Hungarian labour economics research, we saw important advances especially in the analysis of the labour market impact of taxes and transfers. Moreover, the discussion was not restricted to academic circles. Rather, there were numerous attempts to communicate the results to policymaking and to emphasize the importance of evidence-based policymaking.

These new results were often "echoing" the general lessons the original review article drew: "(1) Elasticities or behavioural responses that appear to be small can still lead to important consequences. (2) Thus it is key to estimate them precisely, using micro-level datasets (of households, individual taxpayers, corporations). Macro approaches and arguments may easily lead us astray. (3) We often need even more: a typical cross-section analysis is insufficient to estimate the impact of taxes on labour market participation or corporate investment. In such cases, the solution is to utilize tax reform episodes, calling for sophisticated micro-econometric analyses on appropriate (panel) datasets. (4) Behavioural Responses can substantially influence output [...], social welfare, and budget revenue developments after the reform." (*Benczúr,* 2007, p. 139.)

Meanwhile, there was a rapid acceleration in international public economics research as well, driven to a large degree by the activity of Raj Chetty and Emmanuel Saez. This will be demonstrated in the overview offered by the forthcoming fifth volume of the *Handbook of Public Economics*. The compilation of the new volume is happening so much in real time that new excerpts kept being posted publicly as we were finalizing the chapters of *In Focus – I.* These

drafts were then enthusiastically forwarded to us by US-based public economics graduate students. No surprise that the Introduction of *In Focus – I* has become a review article in its own right, filling an important gap for the Hungarian readership: its focus was broadened from the originally intended conceptual framework to an overview of the most relevant ideas and results of the corresponding Handbook chapter drafts.

Besides producing new, more and more precise and inventive empirical estimates, this new literature was consistently attempting to communicate its results to the policy world. The most representative example is the UK-based *Mirrlees Review*, created by leading international and UK researchers and experts, and edited by the Nobel laureate James Mirrlees. The two-volume book first reviews the *state-of-the-art* empirical and theoretical knowledge about practically all components of a modern tax system. Then, in light of the lessons, it evaluates the current UK tax code and proposes a potential direction for reform.

Good empirical studies require good quality datasets – which are more and more frequently obtained by gaining access to administrative data. The last thirty years has witnessed a two third decline in the number of survey-based empirical studies published in leading economics journals, while the number of similarly placed studies using administrative data has doubled (*Chetty,* 2012). It is no accident that a large number of influential studies use data from Scandinavian countries, where statistical offices are assembling and maintaining linked databases which cover the entire population – and the data are actively shared with researchers. Fearing that the United States would be *lagging behind*, David Card, Raj Chetty, Martin Feldstein and Emmanuel Saez – four key researchers in empirical labour and public economics – were calling for increased and facilitated electronic access to such databases in the US (*Card et al.* 2010). A research group, led by Chetty and Saez, has voluntarily cleaned – and made publicly accessible – the raw data of all US tax declarations (see *Chetty,* 2012 for details). Such databases have many exceptional advantages: (i) there are almost no missing data or attrition problems, (ii) both the filer and the maintainer is interested in good quality data and cross-checking, (iii) long-horizon longitudinal studies are possible, (iv) the large (complete) sample size allows for convincing, non-parametric quasi-experimental setups (and requires less theoretical assumptions). Besides the academic advantages, let me emphasize again that good public policy decisions also hinge on such detailed impact studies.

This exciting period – when, for example, a "new consensus" is emerging regarding the empirical assessment of the elasticity of labour supply to taxation – also brought normativity, optimal tax rate and tax system considerations back into the picture. It certainly involves serious debates – mostly about the taxation of the top 1% of the income distribution, or that of capital income. One should not be thus surprised to learn that in our preparatory and informal

Symposium on *In Focus – I*, the most lively discussions all involved normative conclusions. It sometimes happens that even authors of the same chapter have somewhat diverging views on normative issues.

This is natural, since normative conclusions always involve some social welfare criteria – which is a value judgement, and thus belongs to the sphere of political decision making. The most recent international results and the emerging "new consensus" highlights, however, that one can make certain important normative statements based on a small number of well-defined and well-measured parameters. This is of utmost importance for economic policy debates, since it allows the shift from "faith debates" into disputes about questions like the size and interpretation of certain parameters. For example, the key issues for the optimal top personal income tax rate – discussed in depth in *Chapter 2* – are the shape of the income distribution, the elasticity of taxable income, the margins of adjustment it does and does not capture (shifting between various tax bases versus long-run reactions, human capital accumulation), and obviously the social welfare function.

We would like to bring this diverse, innovative and active literature to a broad Hungarian readership. The chapters of *In Focus – I* all bring a multitude of additional aspects and starting points for the reader. The number of contributing authors has probably exceeded that of any previous volume, representing almost all local research groups that are active in the topic. We hope that our compilation will serve as a useful benchmark for Hungarian academic and public policy circles, giving them valuable and thought-provoking reading, which can also be utilized in their everyday work.

* * *

In Focus – I consists of six chapters. The introductory first chapter (authors: Péter Benczúr and László Sándor) sets up the common conceptual framework for the role of taxes and transfers in the static determination of labour supply and demand. In addition, the chapter provides the Hungarian audience with a new, more comprehensive review of the empirical literature on labour supply elasticities, with in-depth coverage for some selected issues.

The second part of the Introduction surveys the major results and open questions from the recent academic literature on income taxation, drawing heavily on the *Mirrlees Review* and the forthcoming Volume 5 of the *Handbook of Public Economics*. It first presents the classical setup of income taxation, then it proceeds with results and considerations about the "optimal tax base", and finally, it discusses tax differentiation along other aspects than income (tagging). From this collection, many issues will reappear in later chapters, with a more detailed treatment, and often adapted to Hungarian data.

The *Appendix* of *Chapter 1* (written by Mónika Bálint) enlists a set of Hungarian databases, which are particularly useful in the analysis of labour mar-

ket impacts of taxes and transfers but not yet widely employed by researchers. These are: personal income tax files, the Hungarian Central Statistical Office's *(Központi Statisztikai Hivatal)* Household Budget and Living Conditions Survey *(HKÉF),* and the linked administrative database of the Central Administration of National Pension Insurance *(Országos Nyugdíjbiztosítási Főigazgatóság)*, National Health Insurance Fund *(Országos Egészségpénztár),* Hungarian State Treasury *(Magyar Államkincstár),* and the National Labour Office *(Nemzeti Munkaügyi Hivatal)*.

Chapter 2 looks at the intensive margin of labour supply, more precisely: at the elasticity of taxable income (authors: Péter Benczúr, Áron Kiss and Pálma Mosberger). It first surveys the results of the international literature – at greater depth than previous Hungarian reviews –, mostly from a policy applicability aspect. The authors find that international taxable income elasticity estimates tend to be smaller than those in the US. Its most likely cause is that the tax base can be influenced by much more deductions and exemptions in the US than in most other countries. The chapter then proceeds by presenting the results of the two studies that use Hungarian data, partly updating previous estimates of *Bakos et al.* (2008). The results are broadly in line with the international experience: elasticities are not large in general, but they are sizeable for certain subgroups. Relative to the original results of *Bakos et al.* (2008), the new estimates suggest smaller elasticities overall. High income taxpayers are typically more responsive to the marginal tax rate, while – unlike in the international evidence – there is often a significant estimate for the average tax rate, both in the positive and the negative.

Finally, the chapter demonstrates the use of estimated elasticities in "optimal tax rate" model simulations. Based on the corresponding theory, the optimal top income tax rate depends on three parameters: the elasticity of taxable income, a parameter describing the shape of the (top of the) income distribution, and a parameter representing social preferences. According to the calculations, the pre-2010 top marginal tax rate was optimal under a strongly redistributive social welfare function, while the post-2010 top tax rate is consistent with optimality under a less redistributive social welfare function, or a much larger elasticity than the estimates suggest. Such elasticities cannot be supported by existing results. Moreover, the income effect would point towards an even larger revenue-maximizing top tax rate.

Chapter 3 looks at employment, more precisely: the labour market participation decision, also known as the extensive margin of labour supply (authors: Gábor Kátay and Ágota Scharle). It covers two main topics: mostly based on results from a recent study, it first explores whether the tax and transfer system affects labour market participation; and second, it reviews the impact of unemployment benefits on efficient labour market search and job take-up. The empirical analysis of the participation decision suggests that both taxes and

transfers significantly reduce labour supply; while studies of particular types of transfers indicate that it is rather the tightening of eligibility and not the cut of the transfers themselves that could increase labour market activity. Results are similar for job finding rates: when looking at the impact of a cut on unemployment benefits on the timing of taking up a job, no study has found substantial positive effects.

Chapter 4 presents the utilization of a heterogeneous household microsimulation model for assessing the impact of tax and transfer reforms on the economy (authors: Dóra Benedek, Gábor Kátay and Áron Kiss). Heterogeneity can mean that a reform impacts different households differently, or that different households respond differently to a common change.

The chapter first reviews the use of microsimulation methods both in an international and a national context. Then it describes a microsimulation model, developed recently in the Magyar Nemzeti Bank (the central bank of Hungary), and uses the model to assess the long-run impact of hypothetical and actual tax and transfer reforms on the labour market and the macroeconomy.

Let me briefly list and summarize the simulation exercises. The first one compares three alternatives of reforms that are aimed at increasing the labour market participation of low income, and typically also low activity groups. The second part evaluates some revenue-neutral tax restructuring proposals. According to the results, an across-the-board personal income tax cut, financed by an increase in capital income taxes, would boost effective employment. Its impact on GDP, however, is negative, due to the highly elastic response of capital. Cutting transfers brings about positive long-run effects: it leads to lower government expenditures and higher labour market incentives for those who are affected. It is important to note, however, that the simplifications of the model are likely to cause an overprediction of the true long-run effects.

Finally, the authors present an attempt to use the model for quantifying the long-run impact of the most relevant reforms of the last two years. Broadly speaking, the tax and transfer changes enacted (or planned) since 2010 lead to an increase in output, through the intensive margin of labour supply. Their impact on employment is much smaller though still positive: the slight negative impact of all tax changes is reversed by the cut in unemployment benefits. A permanent increase in the required rate of capital can easily turn all the gains negative.

Chapter 5, consisting of many independent subchapters by different authors, shifts the focus from labour supply (employees) to labour demand (employers). According to the most basic framework, labour demand is determined by the price the company can get for its products, wages and labour productivity. In reality, labour markets are more complex, and there are many channels of state intervention: taxes and contributions, minimum wages, firing restrictions and

regulations on the length of working hours. The main topic of the chapter is the impact of payroll taxes, or more precisely: the impact of payroll tax exemptions and wage subsidies.

After a brief introductory part (authors: Árpád Földessy and Ágota Scharle), *subchapter 5.2* summarizes previous results and experiences concerning wage subsidies (authors: Péter Galasi and Gyula Nagy). It draws two main conclusions. 1) According to the single program evaluation study looking at the wage subsidy programs in the mid-90s, those programs did not increase employment probabilities. 2) The impact of similar programs in the 2000s shows a marked heterogeneity, along gender, age and education.

Subchapter 5.3 (authors: Zsombor Cseres-Gergely, Árpád Földessy and Ágota Scharle) describes a recent study on the impact of the wage subsidy scheme "Start card". It finds that even a temporary wage subsidy can be efficient, if it is well-designed and targeted. In particular, the program "Start Extra", which was offered to jobseekers above 50 and with at least a secondary education, was cost-efficient for men, even when one only looks at short-run benefits. The overall efficiency of the program could be increased by restricting its target group to the less-than-secondary education group, and by adding extra job search incentives for women.

Subchapter 5.4 analyses another main type of government intervention: minimum wages (authors: Ágota Scharle and Balázs Váradi). It first reviews the international and Hungarian evidence and experience about the use of differentiated minimum wage cuts as a tool to increase employment. Then the authors summarize the main arguments they had in a previous proposal, calling for regional differentiation in minimum wages.

The last subchapter summarizes the literature on the long-run equivalence of employer and employee contributions (author: Árpád Földessy). Though there is sufficient empirical evidence for the equivalence, there are some assumptions of the theoretical reasoning which can be violated in reality. The theoretical result may not hold under strong union influence, progressive taxation, if the minimum wage is close to the equilibrium wage, or if unemployment benefits are proportional to gross wages or are taxed. Another departure can come from the possibility that net wages are not the only determinant of employer attitudes, but social norms are also important. Though it is not obvious to analyse the impact of social norms by standard economic techniques, there is evidence for their influence. It nevertheless does not lead to a violation of the equivalence of employer and employee contributions.

The last chapter of *In Focus – I* analyses the issue of labour market related tax avoidance and evasion (authors: Dóra Benedek, Péter Elek and János Köllő). In other words, it looks at black and grey employment patterns. These topics get a central stage in Hungarian economic policy debates, and for a good reason. Their prevalence crucially influences the total economic ef-

fect of a minimum wage increase, a tax cut for low earners and many other policy actions.

After a short introduction, the chapter first presents an overview of existing international evidence on the importance of the shadow economy and employment. Then it proceeds with a detailed, micro-based analysis of employment-related tax evasion in Hungary, looking at black and grey employment, and the self-employed. Finally, its last subchapter uncovers the (re)distribution aspects of tax evasion, also building on microdata.

Based on studies comparing the *Hungarian Labour Force Survey* and administrative data, the estimated share of unreported (black) employment was between 10 and 17 percent over the time period of 2001–2007. The results vary with the estimation method and the particular subsample considered, but they show no clear time pattern. Black employment is particularly relevant for men, the self-employed, in the central region of Hungary, and in certain professions like structural architecture and personal services.

Looking at grey employment, the authors present evidence that disguised minimum wage earners tend to be concentrated in certain subgroups: they are more frequent in the construction and retail sector, and in very small enterprises. In other sectors, also exhibiting high rates of minimum wage earners – such as the cleaning industry and unskilled labour in general – the degree of income under-reporting is much smaller. An important result is that more than half of the total unreported income bill comes from the top quintile of the (true) wage distribution.

Consequently, a minimum wage increase has a limited impact on the amount hidden from the tax base; while it adversely impacts the employment of the unskilled, who are true minimum wage earners. A well-designed differentiation of the minimum wage (for example, a higher minimum wage for university graduates), on the other hand, can perform well as a whitening device.

Finally, the chapter presents estimates about the full amount of income underreporting. By comparing income data from the *Household Budget Survey* and personal income tax files, average income underreporting is estimated to be in a range of 9–13%. Its incidence is higher among low and high earners. Income distribution patterns of income underreporting broadly coincide with those of black and grey employment: tax evasion is higher among men and the self-employed, and in the central region of Hungary.

The chapter also contains three special topic boxes. István János Tóth and Mihály Fazekas preview their recent results from a survey on envelope wages, providing a first evaluation of the impact of the crisis on income underreporting. Mirco Tonin reviews his earlier research results on the link between minimum wage regulation and tax evasion. And finally, Árpád Földessy and Ágota Scharle analyse the impact of temporary employment booklets *(alkalmi munkavállalói könyv)* on black and grey employment.

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1. INTRODUCTION

PÉTER BENCZÚR & LÁSZLÓ SÁNDOR

In this introductory chapter we sketch the common conceptual framework of this *In Focus – I*. Foremost, we show what roles taxes and transfers play in determining labour supply and demand.[1] Several other reviews are already available in Hungarian, e.g. the survey of *Benczúr* (2007) and the comprehensive tax reform study of *Scharle et al.* (2010). In order to facilitate the reading of the ensuing chapters, we repeat here the basics from these two prior studies. Occasionally, we make significant extensions and updates, in which cases we also flesh out some insights in more detail. The second half of the introduction briefly reviews the international literature of income taxation, its cornerstone results and open questions, largely relying on the extensive *Mirrlees Review*[2] of the British tax system and the fifth volume of the *Handbook of Public Economics* now under preparation. Finally, the Appendix (written by *Mónika Bálint*) describes Hungarian databases which allow microempirical analysis of labour taxation, and summarizes their availability.[3]

The conceptual framework

Labour supply

The (static) approach to labour supply supposes that each individual chooses how much to work according to the utility derived from leisure and consumption.[4] When the net wage falls, they can afford less leisure (this is the *income effect*), while the income forfeited when not working also falls, and the *substitution effect* drives the worker to buy more of the now-cheaper leisure. The compound effect of these two forces has an ambiguous sign even in theory: at high wages a pay raise (tax cut) can drive a person to lower their labour supply, as their higher income increases their demand for leisure more than how much the higher wage incentivizes extra work. This is the phenomenon of the *backward bending labour supply curve*.

Two fundamental aspects of the labour supply decision can be distinguished: first, the decision whether one works or not (*the extensive margin*); second, the amount the person works (*the intensive margin*). In the latter case, not only hours worked but also *the quality and intensity of work* is a choice of the worker. Though this can be observed less directly, one can assume that total earnings are intimately related to work intensity – think of performance pay, bonuses, promotions, or human capital accumulation.

1 We are grateful for comments from *Peter Hudomiet*, *Attila Lindner*, and *Áron Tóbiás*. All remaining errors are our own.

2 Two excellent critical reviews of *Mirrlees et al.* (2011) came from *Atkinson* (2012) and *Feldstein* (2012). A similar project for France was completed by *Landais et al.* (2010). The link of theoretical results and practical policy is reviewed by *Boadway* (2012), looking both back and forward in time.

3 The appendix primarily surveys databases newly available for labour market research. Well-known databases such as the Hungarian Wage Rate Survey or the Labour Force Survey are described in detail in the Statistical Data section.

4 The dynamic approach is similar, yet part of the decision concerns the allocation of labour supply and consumption over time. *In Focus – I.* follows basically the static approach. On the dynamic case, see for instance *Keane* (2011).

The incentive effects of tax systems have two key indicators. *Average tax rates* indicate the fraction of the total income a taxpayer pays as taxes, while *marginal tax rates* measure how much more they would pay in taxes, should they earn a unit more, all levies combined.

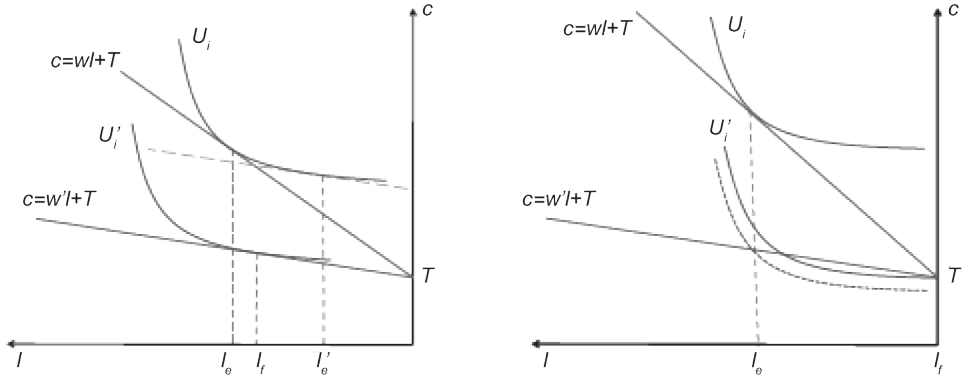
In this regard, it is important to treat taxes together with various, often income-dependent (means-tested) benefits[5] – the real question is how much one can take home from one's income after paying taxes and getting transfers (which is *the effective tax rate*, see *Scharle*, 2005). The take-home share (*net rate*) is also called the *tax price*.[6]

Marginal tax rates have only substitution effects on decisions about hours worked and work intensity (or together: *the effective amount of labour*): a tax rise that affects only the last dollar earned induces a reduction in the effective amount worked. This is illustrated in the left panel of *Figure 1.1:* the decrease of the net wage from w to w' (a rise in the marginal tax rate) with utility kept constant (a rise in the marginal tax rate) decreases hours worked from l_e to l_e'. The sign of the substitution effect (for a consistent, "rational" worker) is thus always negative: a higher marginal tax rate decreases the amount of labour supplied.

5 Some transfers are lost with basically the first earned forint, resulting in a discrete, discontinuous jump in the budget set at zero hours of labour. Potential remedies of this effect are discussed in detail *Chapter 3*.

6 Which is thus one *minus* the corresponding tax rate.

Figure 1.1: Labour supply incentives of average and marginal tax rates



Legend: *l:* amount of labour, *w:* wage, *T:* non-labour (unearned) income, *c:* consumption, U_i, U_i': indifference curves.

Raising average tax rates, in contrast, can even raise the amount of labour supplied, as it also decreases disposable income. This is basically the income effect of a tax change: without changing the (local) slope of the budget constraint (the net wage), this tax rise shifts the line downwards, changing labour from l_e' to l_f (left panel of *Figure 1.1.*).

The magnitudes of the effects are usually measured as *elasticities*, which show the percentage response to a percentage change in the average or marginal net rate of hours worked (the intensive margin) or the propensity to work (the extensive margin). The *uncompensated labour supply elasticity* shows

the total effect of a wage change (the sum of the substitution and the income effects), while the substitution effect itself is measured by the *compensated elasticity*.[7]

For the decision to enter work the fall in the average tax rate is a positive incentive, since this increases the return on entering relative to inactivity. In the simplest case a tax rise can push one into inactivity (i.e. a corner solution: the indifference curve would be tangent to the budget line at some negative amount of labour). The more typical mechanism works through the fact that most jobs have a minimum amount of labour (you cannot work less than a certain threshold – think of part-time or full-time work), which means that in spite of working only for a short period being optimal for the worker, this is impossible in practice.[8] In this case, a tax rise can suddenly make the worker choose inactivity, which of course can mean schooling, child care or retirement too.

This is shown in the right panel of *Figure 1.1*. For the initial net wage w, the worker works l_e hours (for instance, full time). By a lower net wage w', having to choose between zero and l_e hours, they choose $l_f = 0$ (the interior solution at the point of tangency is unavailable because of minimal job size). This choice is driven by the average tax rate on the monthly gross wage; i.e. the earnings difference between full-time work and inactivity. For this reason, the average tax rate is also called *the participation tax rate*.

All the various taxes levied on earnings combined constitute the full *tax wedge*. This shows the deviation from a world without intervention, when the marginal product of labour would equal the marginal rate of substitution between leisure and consumption. On top of taxes levied directly on the worker, employer-paid contributions also feature prominently in the full tax wedge, as they also affect the relation between the full labour cost to the employer and the net wage received by the worker. Furthermore, consumption taxes also affect the consumption-labour trade-off, as they also change the amount of goods one can get in exchange for working.[9] Thus the average effective rate of consumption taxes also shows up in the full tax wedge.

In practice, different types of labour income can face different tax rates: for non-employment assignment contracts in Hungary, for instance, only 90% of earnings are taxable. Tax treatment also differs for fringe benefits such as a corporate car, phone or cafeteria. We can weigh these taxes by the fraction of these benefits in the total income to get at the effective average tax rate – for marginal rates the question becomes in what form the worker would receive an extra unit of income. Moreover, various tax benefits, allowances, credits and deductions can change tax rates; average tax rates necessarily, but also marginal tax rates (e.g. if eligibility is phased out above a certain income level). And in case there is a connection between some amount paid and some benefit in return (in Hungary, mainly pension contributions worked this way), the worker's valuation of the extra benefit decreases the net amount taxed away.

7 In the dynamic approach, one version of the compensated elasticity, the so-called *Frisch elasticity*, is one of the most important indicators. This measures the labour supply response under the condition that wealth has constant marginal utility, thus instantaneous labour supply can also change because of intertemporal substitution (taking advantage of a temporary earnings opportunity, without future wages changing).

8 Under such "practical reasons" underlie the general argument that employers have concave costs of employment and thus there is no such labour demand, or some employees face concave costs and thus such individual labour supply is rare (which, through firm-level coordination problems imply that there is no such firm-level labour demand either).

9 Under some conditions (e.g., no savings or capital income) labour income taxes and consumption taxes are equivalent to each other. In general, there is little long-run difference between a tax system taxing purely labour (but not consumption or savings) or one taxing consumption only. For details, see *Scharle et al.* (2010).

Labour Demand

While labour supply is determined by the preferences of the (potential) worker, *labour demand* is a function of labour's productivity – assuming perfect competition in both product and labour markets. This increases with higher levels or lower costs of general technology and development, capital, and other factors of production (e.g. complementary skilled labour). In classical economic models with perfect competition, the employer pays its employees the level of wages which correspond to how much they contribute to its revenues through the production process (the value of the marginal product of their labour). Even with the employer taking wages as given, we can distinguish short-term and long-term labour demand (the latter allows a change in capital and other factors of production, the spread of all relevant information, etc.). It is easy to prove that the long-term elasticity of labour demanded with respect to unit labour costs is equal to the elasticity of substitution between labour and capital.[10]

Scharle et al. (2010) briefly survey the empirical literature on labour demand in Hungary. Studies of direct personnel demand using individual-level observations find elasticities close to the international average, between –0.5 and –0.8 (*Kőrösi*, 2005). Estimating the elasticity of labour-capital substitution from an empirical investment equation, *Kátay and Wolf* (2004) find a long-term value of –0.8, close to the estimates from personnel demand equations.

Numerous government programs and interventions aim to change labour demand. *Sections 5.2* and *5.3* analyse the effects of various *wage subsidies* in detail. Though in the long run these are supposed to work through the tax wedge (i.e. when employer and employee contributions are equivalent and they have an effect through labour supply), in the short run they can have a direct effect on labour demand and can be more effective countercyclical incentives (we discuss this in detail in *Section 5.5*).

The other well-known, primarily demand-side intervention on the labour market is the institution of *minimum wages*. This introduces a lower bound for wages, thence firms have no more incentive to employ some workers, since their contribution would be less than the legislated minimum wage. So in this way the minimum wage can decrease employment. Yet if there is no perfect competition in the labour market, or where companies can affect wages for other reasons, raising the minimum wage might even increase employment.

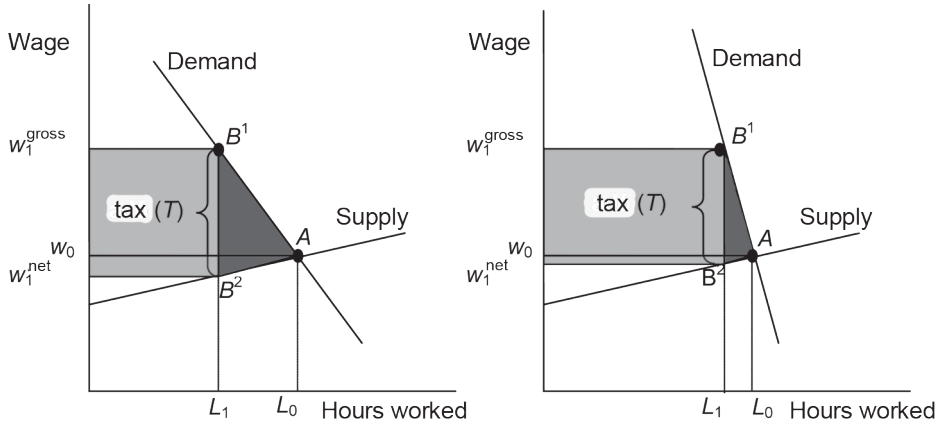
Meanwhile the minimum wage can be socially beneficial because it does not allow wages of subsidized low-income people to fall in line with their increased labour supply. This can reinforce the power of the subsidy and the scope for redistribution – besides which it is necessarily inefficient (even self-contradictory) to levy any taxes on minimum wage earners (*Lee and Saez*, 2012). *Section 5.4* discusses these aspects as well.

10 To be precise, the proposition assumes a constant returns to scale, two-factor, constant elasticity of substitution (CES) production function.

Labour market equilibrium

The equilibrium of labour demand and supply can be seen on *Figure 1.2*. The horizontal axis shows the effective amount of labour, the vertical the wage. The demand curve is downward sloping: firms hire fewer workers amid higher unit labour costs ("super-gross wages"). The supply curve is upward sloping: workers are ready to work more for higher net ("take-home") pay.

Figure 1.2: Equilibrium of labour demand and supply with a unit tax on labour



The two panels differ in the wage elasticity of labour demand: the same wage change increases the amount of labour demanded less on the right-hand side (smaller elasticity). The market equilibrium with no taxes is at the wage level where quantity demanded and supplied are equal (L_0 of point A). Here the full cost of labour equals the net wage (w_0).

Let us introduce now a unit tax of T (among labour taxes, such is the health care contribution). The new equilibrium arises at an employment level (L_1) where the difference between the gross wage of the labour demand curve and the net wage of the labour supply curve equals the tax. It is important to note that this result does not depend on whom the tax is levied (in the long run). We can check this in the figure by plotting demand and supply in terms of gross and net wages, respectively.

What will happen to tax revenues? With no behavioural response (no change in the quantity demanded or supplied), we could expect revenues $T \times L_0$. The introduction of the tax will decrease employment though, and actual revenues will only equal *the light grey area*, $T \times L_1 < T \times L_0$. What is happening to social welfare in the meantime? As a potential measure, let us look at the sum of *consumer surplus* and *producer surplus*. In *Figure 1.2* the triangle shaped area between the demand curve and the equilibrium wage shows the size of the consumer surplus (in the labour market this goes to the employer), i.e. the sum by which employers value the employed labour above the actual wage. The producer

surplus (in the labour market this belongs to employees) is the area between the supply curve and the horizontal line corresponding to the given wage, which shows how much more employees value their income above their forfeited leisure.

At the introduction of the tax, both surpluses decrease: consumer surplus by the area of the trapezoid between segments $w_0 - A$ and $w_1^{gross} - B^1$, producer surplus by the area of the trapezoid between segments $w_0 - A$ and $w_1^{gross} - B^2$. But not all of this is a loss, as the government also collects revenues – exactly in the amount corresponding to the area of the light grey rectangle. The sum of consumer and producer surplus on the one hand, and government revenue on the other, decreased thus by the area of the darker triangle. Its area is $1/2 \times T \times (L_0 - L_1)$.

Both the missing tax revenue relative to the case without behavioural responses, and the *deadweight loss* of the tax, are a function of how much employment decreased. A comparison of the right and left halves of the figure also reveals that this is larger when supply and demand curves are flatter, or employment changes more for any wage change. In other words, when demand and supply are more elastic.

Finally let us see how the burden of the introduced tax is shared between employees and employers. This is called *tax incidence* in the literature. We again stress that this is not about the legal split but about who is contributing to the tax revenue. It is easy to see in the figure that gross wages go up by $w_1^{gross} - w_0$ while net wages decline by $w_0 - w_1^{net}$. We can easily see that their relative size depends on the *relative* slope of the supply and demand curves.

The elasticity of labour supply

Are there segments of the labour market which exhibit a significant supply elasticity? The traditional labour economics literature analysing US data found essentially zero elasticity of hours worked with respect to wages[11] (*Pencavel*, 1986); i.e., wage changes lead to basically no changes in labour supply. Similarly low elasticities were found in Hungarian data by *Galasi and Nagy* (2003) and in Czech data by *Bicakova et al.* (2006). The pioneering studies taking the nonlinearities of the tax system into account could find much higher elasticities (*Hausman*, 1981), yet the methodology applied did not prove reliable enough. Subsequent studies could not show a significant effect of the tax system on the labour supply of primary earners[12] (*Heckman*, 1993, *Blundell and MaCurdy*, 1999). For secondary earners, however, multiple studies found robust and large effects, especially on the extensive margin (*Eissa*, 1995, *Eissa and Liebman*, 1996).

In Hungary, we can expect larger effects among the less educated, lower-income, or otherwise disadvantaged workers. This is reinforced by the fact, as shown by *Scharle* (2005), that effective marginal tax rates are especially high for certain low ranges of earnings.[13] The results of *Benczúr et al.* (2012) on

11 The wage elasticity here is the ratio of the percentage change in hours worked or the propensity to work and the percentage change in the wage.

12 By primary earners the literature basically means prime-age men. Among them, labour market participation is close to complete, so their extensive margin (participation) decision is often ignored.

13 The labour market incentives embedded in the public pension system have been extensively analysed for Hungary. For example, *Cseres-Gergely* (2005) found that the generous text treatment of pensions is a significant disincentive for labour market activity, because net earnings decrease much less after retirement than gross earnings.

Hungarian data also show that taxes affect labour market activity especially in these groups. (We take a closer look at this question in *Chapter 3*.)

The elasticity of taxable income

Empirical studies took a significant turn when they started to look at the effects of income taxes not only on hours worked but on taxable income altogether. The seminal study of *Feldstein* (1995) on US data found very high elasticities, in excess of 1. This decreased with the refinement of the data and methodology used, and the current consensus is around values of between 0.12 and 0.4 (*Gruber and Saez*, 2002, *Saez et al.* 2012). *Chapter 2* covers this literature in detail, adding the corresponding Hungarian estimates, and discussing the policy relevance of the results.

The impact of tax rates on taxable income has been in the focus of recent studies, because it is a *sufficient statistic*[14] for the effects of the taxes: it encompasses the compound effect of all potential responses, be they more overtime, less tax evasion, more work effort, a quick training, or delayed child-bearing. Moreover because tax shocks are exogenous changes in the price of labour – independent of individual choices, demand and supply, and other unobserved factors –, more general studies of labour supply also turned to analyzing tax changes, and this literature is rich in methodological innovations. More and more, the studies use robust, nonparametric methods, extensive databases of all taxpayers over multiple years, with data collected and scrutinized for administrative purposes.

Some types of responses can still be missing from the estimated response of taxable income. In what follows, we discuss two main cases, with two subcases and main examples of each. All this is covered in more detail than above, to introduce the issues and approaches to the Hungarian audience.

Underestimated elasticities. First, one rarely observes collective responses, especially for changes that affect only a small fraction of taxpayers. The distortionary costs of taxes could be summarized by the frictionless changes of labour supply, independent from any other constraint or factor – but factors such as labour demand, especially work organization and the labour supply of other colleagues do not allow full adaptation in the short run. The limited response of taxable income could mistakenly lead to an underestimation of the real costs according to true preferences. In the long run, with new collective agreements or job switches one could observe sharper, larger responses reflecting the true valuation of employees. This is shown by *Chetty et al*. (2011) for example, who document collective income movements following the shifts of tax brackets in Denmark. This coordination problem, similarly to the misunderstanding or the ignorance of taxes, is essentially a *friction* (a false rigidity), which can improve over time – or even spreading in space, as *Chetty et al*. (2012b) document for the United States.

14 An excellent review of the significance and widespread use of such measures of composite effects is given by *Chetty* (2009a).

Both studies use the nonparametric methodology allowed by rich, "large datasets", where the concentration of taxpayers around the kinks of their budget constraints (the spike in the density of earnings or taxpayers, *bunching*) helps to measure responses,[15] or in the US case the salience of incentives. *Saez* (2010) derived that such concentrations are larger with more elastic responses: when workers are more sensitive to deviations from their expected effort, more of them would work more on the side of the kink that is taxed less, but less on the other side of the kink taxed more, thus the kink is the optimal choice for more people. The Danish study of *Chetty et al.* (2011) found that earnings concentrate around kinks of the majority of colleagues even for whom the kink would be somewhere else individually. The US study of *Chetty et al.* (2012) meanwhile identifies the local familiarity with the earned income tax credit by the degree of bunching of the self-employed who apparently adapt (or evade) conspicuously well.

Another example of frictions due to employers and co-workers comes from *Saez et al.* (2012), and goes against the theory of tax incidence discussed above. A Greek reform raised contributions only for a fraction of workers. One could expect that employers shifted the burden onto those affected, but this is not what happened: employers kept the burden of higher employer contributions for themselves, but shifted to workers in the case of higher employee contributions. It is a cautionary tale that norms of justice (discrimination at the workplace or different gross wages being unacceptable) can override the most basic economic (incidence) expectations that we derived from individual incentives, even in such a transparent case. In a Hungarian example, this could mean that a subsidy of young mothers will not necessarily be shifted on raising their wages if the differentiation between mothers and their colleagues would prove too controversial or cumbersome.

Second, long-term responses are rarely observable, and on a short timescale of a study, adaptation to transaction costs could prevent responses from reflecting true preferences. This is where *Chetty* (2012) has made progress when he looked at the information content of studies following large tax changes. He assumes that even an ignorant or inert employee, when facing large enough utility losses, would get over the frictions. The size of the tax change affects the cost of an imperfect response. Thus from every study we can infer what the true elasticities are that can correspond to the documented imperfect responses. According to *Chetty* (2012), among the estimates of the most influential studies of the last three decades, various though they may be, there is still an overlap for the underlying structural elasticities they allow: an intensive margin compensated wage elasticity of 0.3 is consistent with most of the important results from the modern empirical literature. This can be seen as the new professional consensus according to the surveys of *Saez et al.* (2012) and *Piketty and Saez* (2013) as well.

15 Nonlinear budget constraints are treated in more detail in the review of *Benczúr* (2007).

Adaptation costs might be the prime remaining reason why one could still expect high social costs of taxation – even in spite of numerous studies finding small responses and thus small costs from precise estimates in rich data, but only in the short run. Convincing measurements of the really long-run responses, like counterfactual careers or school choices, still await even the international literature. Such calculations are only available from macroeconomic calibrations.

That said, long-run expectations about future taxes can have important effects in the short run, which is neglected even by the best available empirical labour supply elasticity estimates – *Kueng* (2012) meanwhile calculates (surprisingly realistic) tax expectations from the spread between taxable and tax-exempt bonds, and documents significant forward-looking consumption responses to them.

The empirical literature of extensive margin elasticities is reviewed by *Chetty et al.* (2012a). The study also tries to reconcile the results with the macroeconomic literature of indivisible labour, which arrives at different elasticities from calibration. Because the extensive margin is more intimately related to decisions over the lifecycle (intertemporal substitution), the dynamic treatment is appealing, hence the connection. Moreover, the substitution between time periods or risk aversion, which are so important for finance or dynamic decisions, are similarly a function of the curvature of utility functions, as is the substitution between consumption and leisure. This determines how quickly the marginal utility of consumption is decreasing. This intimate but somewhat neglected connection has been exposed by *Chetty* (2006).

The long run, steady-state elasticity of labour supply corresponds to the compensated, Hicksian notion, and the empirical results from individual-level studies of 0.3 on the intensive and 0.25 on the extensive margin are consistent with standard macro models. However, microempirical studies are also able to estimate Frisch elasticities, which incorporate intertemporal substitution, and the consensual estimates of 0.5 on the intensive and 0.25 on the extensive margin are definitely smaller than what could explain the employment fluctuations over the business cycle in developed economies in current macro models.

Elasticities affected by the tax system. In two important cases, the tax system itself affects the size of elasticities. With precise and unbiased estimates on the latter, the elasticity of taxable income is a correct and sufficient statistic to evaluate the current tax system. It offers less guidance, however, on what effects, distortions and costs we could expect from (thought) experiments of other reforms.

First, the tax system with its too narrowly defined rules can generate new, artificial, and often quite elastic responses: tax evasion, geographic mobility, or shifting income. In these cases, though studies correctly estimate the composite response, it is still not a sufficient statistic for assessing the damaging or distortionary effect of another tax with fewer loopholes or better enforcement. A tax levied on a broader base, with fewer exemptions and deductions, which taxes easily transformable forms of income the same way, might be able to generate the previous levels of government revenue with smaller rates, and distortions would further decrease because the remaining responses show smaller elasticities.[16]

The (international) mobility of the wealthy and thus the amount of mobile income can be significant,[17] though usually the emigration elasticity of the native rich is lower (~0.15) than that of immigrant foreigners (~1). This limits only tax systems with a significant number of wealthy immigrants. *Kleven el*

16 A robust model and an empirical calibration of such *fiscal externalities* of taxes is given by *Piketty et al.* (2011). *Kopczuk* (2005) showed empirically that the 1986 tax reform in the United States with its uniform rates and closing of loopholes led to a decrease of the measured elasticity of taxable income.

17 In this regard, *Keen and Konrad* (2013) give a good review of the literature on international tax competition and coordination.

al. (2012) document significant mobility for soccer players in Europe, while *Kleven et al*. (2011b) analyse a Danish immigrant tax exemption, and find very high tax elasticity of moving (1.5).

This phenomenon is similar to the fact that the relevant elasticity can be higher because of potential tax evasion or simple income shifting. This is now the mainstream interpretation of the estimates of *Feldstein* (1995): some of the large effects after the 1986 cut of American income taxes followed from the fact that labour was suddenly taxed less than capital income, which changed the form in which business-owners took value out of their company. Also, *Goolsbee* (2000) showed something similar for the 1993 US tax increase; that its apparent big effect came largely from the corporate executives in question rearranging their remuneration in the short run: they took their money out before the tax rise, which then implied surprisingly large income drops with the higher taxes.

Second, the *salience* of taxes (and benefits) is crucial: a misunderstood tax obviously has different effects than a clearly understood system. It is an important lesson though, that the tax distortions can even decrease this way, and of course the corresponding elasticity estimates may also change accordingly. If labour supply drops less after a tax hike than if gross wages had decreased by the same amount, the distortionary costs of the tax are smaller (*Chetty*, 2009b). The worker would miss the lost income even after an ignored tax, yet the income effect is unavoidable even under an ideal sharing of the burden, and a forgotten tax causes no deadweight loss on top of that. Of course, a misunderstanding can also induce completely pointless responses (high elasticities), when the distortion is an unnecessary cost. A particularly important example for the latter can come from pension contributions. The closer a pension system resembles individual savings, i.e. the more direct is the perceived connection between in-payments and the present value of future benefits, the less there is for the worker to react to. Their performance, their value added can stay what they would choose according to their preferences and their productivity, hence efficient and just.[18] Yet if the taxpayer thinks that their pension contribution is lost – or at least it is unrelated to their future benefits – they would work less, since the (perceived) returns to work decreased.[19]

The previously discussed concentration-bunching method has been advanced in this regard by *Kleven and Waseem* (2012). They measure and quantify ignorance, errors, or frictions from the extent that Pakistani employees reported earnings which no preferences could rationalize, because they could have taken home more pay with less work.

It is an important practical aside that relieving-solving informational problems can be a much cheaper way of guiding agents towards more efficient solutions and choices than ramping up ill-understood incentives. *Chetty and Saez* (2013) conducted a field experiment among Americans eligible for the earned

18 This is also the main argument for a French reform of *Bozio and Piketty* (2008).

19 *Liebman, Luttmer and Seif* (2009) document that incomes change significantly with pension benefit rules. On the contrary, *Friedberg* (2000) found significant effects even where American pensioners would have actually got back their benefits lost due to higher income – which must have been a misunderstood, unnecessary, costly response.

income tax credit, where they find that a cost-effective explanation had as large an effect on the next two years' earnings as if they had increased the subsidy itself to a large extent.

Tax evasion

Tax evasion is important for all taxes, including labour income taxes. It is paramount to distinguish *tax evasion*, which breaks the rules explicitly, from *tax avoidance*, which follows the letter of the law, if not its spirit. The problem is not only that they decrease government revenues, but also that they distort the redistributive effects of the tax system in many ways. On the other hand, when the tax system prices out otherwise legitimate economy activity, it might be beneficial for social welfare if the transaction still takes place after some tax evasion.[20]

The canonical deterrence model says that tax evasion is driven by its relative return, i.e. how much one can save on the tax relative to paying it in full (*Slemrod and Yitzhaki*, 2002). The real-world willingness to pay taxes cannot be completely explained by the probability of getting caught and penalties, as many more pay more taxes than what the standard model would predict. In the baseline model, however, the rational comparison of evaded taxes and expected penalties does not take into account social norms and interactions, like some respect for rules, some need for belonging and conformity, learning from others, or fairness.[21] These factors can drive people towards paying more taxes, yet they can also prove a social cost of tax evasion: if the tax system is known to lead to evasion, the knowledge of rules being broken leads to losses of individual utility and thus social welfare.

Indicators of redistribution

One of the main features of tax systems, and income taxes in particular, is their *progressivity*. This means that someone with a higher income contributes more to public funds. *Chapter 2* discusses the connection between the earnings distribution and progressivity in more detail, but we lay down some general aspects here.

It is a general feature that the upper deciles of the income distribution, let it be labour or capital income, accrue a disproportionate share of total income.[22] This is not at all surprising: all members of the top 10% have incomes much larger than the average income, so their total income is bound to be more than the tenth of the population's total income. This also means at the same time that a 1% increase in the economic activity of the top 10% will result in a much larger increase in total income than the same for the bottom 10%.

Measures of this disproportionality, which many say erode social welfare, can describe the entire distribution, like the Gini coefficient, or compare different points of the distribution, like the ratio of the top 10% and the median. A

20 Some elements of tax evasion waste resources (e.g. when we carry around cash needlessly, or we choose a product not really of our fancy), but this loss is captured by taxable income as a sufficient statistic. The latter can still be upwardly biased, towards excessively strong responses, if tax evasion did not fully destroy value added, it only transferred some income. A sufficient statistic for the efficiency loss in this case has been derived by *Chetty* (2009c) and applied to the flat tax reform of Russia by *Gorodnichenko et al.* (2009), finding much smaller welfare gains from the flat tax than what was apparent otherwise. The fiscal externalities of *Piketty et al.* (2011) can be interpreted similarly.

21 The canonical model also ignores the issue of practical methods for tax evasion or hiding income. In this regard, the finding of *Kleven et al.* (2011a) is especially interesting: in Denmark, employer-reported income data is much more reliable than self-reports. According to their explanation, at larger workplaces there is no stable equilibrium of hushing up and letting each other hide some income. *Kumler et al.* (2012) find something else for Mexico: in less developed countries even corporate income reports can be improved by better incentivized reporting. In advanced economies, it was partly the result of technical progress that they could improve the institutional efficiency of the tax system by collecting reported earnings (resulting in smaller fiscal externalities and elasticities).

22 It is important to add that here we talk about the distribution of annual snapshots, and part of the big differences come from the lifecycle, temporary shocks, or the entry of more productive generations. This sheds a different light on these differences and how just they are.

progressive tax system decreases inequality, yet it makes the distribution of tax payments even more disproportionate: in Hungary the top 10% of the income distribution has 35–38% of total income, but 55–59% of all tax receipts come from them (considering only earnings of employees, 2000–2010, see *Table 1.1*).

Table 1.1 shows the evolution of the distribution of earnings and personal income tax contributions of Hungarian employees', based on individual income tax records from 2000 to 2010.[23] The table confirms the unequal distribution of both income and tax receipts: the bottom three deciles get roughly 7–9% of income and pay 1–3.5% of personal income taxes,[24] the income share of the middle five deciles is 38–42%, with a tax share of 16–19%. The ratio of the top 10% of incomes and the median income stayed roughly constant, between 2.5–3; while ratios involving the bottom 10% are unstable due to the cell size of the database.

23 As we mentioned before and will discuss in more detail in the next section, in the ideal case, the true distribution of goods could only be seen from a holistic, systematic analysis of all income, all taxes, and all benefits. We cannot venture to do so here, yet we still think that this partial information on the income distribution is still interesting news for most readers.

24 2004 and 2005 values are biased downward by the imprecision of income cells in the database.

Table 1.1: Distribution of income from personal income tax records, 2000–2010 (annual income, in thousand forints)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Bottom three deciles											
Income cut-off	405	505	585	595	575	625	775	875	925	925	925
Average income	261	349	336	391	341	365	495	541	550	551	539
Income share	8.01	9.15	6.99	8.31	4.97	5.03	8.58	7.81	7.67	7.98	8.01
Tax share	2.91	3.51	2.11	1.35	0.61	0.68	1.26	1.32	1.27	1.24	1.20
Middle five deciles											
Income cut-off	1,150	1,350	1,550	1,850	1,925	2,125	2,275	2,475	2,625	2,575	2,575
Average income	751	872	950	1,109	1,088	1,184	1,359	1,498	1,582	1,572	1,588
Income share	38.84	38.33	40.04	40.44	42.53	41.89	39.24	41.05	41.36	41.01	40.29
Tax share	26.89	27.05	25.86	23.59	21.89	21.00	22.76	25.67	25.42	24.33	22.81
Ninth decile											
Income cut-off	1,650	1,950	2,125	2,375	2,775	3,050	3,250	3,550	3,750	3,650	3,750
Average income	1,412	1,654	1,881	2,170	2,311	2,554	2,728	2,967	3,140	3,074	3,112
Income share	15.70	15.64	15.64	12.97	16.19	16.51	15.99	15.72	15.34	15.02	16.53
Tax share	17.33	17.29	17.85	16.00	19.71	19.63	19.29	18.85	18.66	18.13	17.11
Top decile											
(Ceiling of 99th percentile)	4,875	5,500	5,500	6,500	7,750	8,250	9,250	9,750	10,250	10,250	10,250
Average income	3,170	3,720	4,128	4,512	5,189	5,747	6,131	6,566	6,930	6,788	6,939
Income share	37.45	36.88	37.33	38.28	36.31	36.57	36.18	35.41	35.63	35.99	35.17
Tax share	52.86	52.16	54.18	59.07	57.78	58.70	56.69	54.16	54.65	56.30	58.89
Inequality measures											
p90/p50	2.48	2.55	2.59	2.73	2.85	2.98	2.89	2.78	2.83	2.75	2.83
p50/p10	2.96	2.59	2.88	2.95	3.55	3.73	3.46	3.00	3.53	3.53	3.53
p90/p10	7.33	6.61	7.46	8.05	10.09	11.09	10.00	8.35	10.00	9.73	10.00

Note: *Thresholds* can only be determined at 50,000 forint resolution for lower incomes, at 100,000 forints for higher incomes, and at 250,000 forints for the highest incomes. This introduces artificial fluctuations in inequality measures involving the bottom decile (p90/p10, p50/p10). In 2004 and 2005 there is particularly large

error in the cutoff for the bottom three deciles in all rows, and the middle five deciles' average income, income share, average tax and tax share. The *income share* shows the fraction of total income the group has. The *tax share* shows how much of the sample's total tax receipts come from the group. The annual average exchange rate was approximately 243–265 Forint per euro in years 2000–2008, 298 in 2009 and 272 in 2010.

Source: The authors' calculations, using *APEH (NAV)* data by income groups, for employees only.

The theory of optimal income taxation

All the previous concepts describing and evaluating tax systems lead us naturally to the literature on optimal interventions and tax schedules. In what follows, we briefly summarize the theoretical results and guidelines most relevant to subsequent chapters of *In Focus I*.

The fundamental problem of income taxation

Members of a political community finance their public goods (such as public safety or healthier and more educated neighbours) from their tax payments, which can alleviate free-riding problems and lead to higher public good consumption for all.[25] Most citizens probably value this in excess of their individual contribution: the value created benefits all, while its cost can be pooled, spread, shared, and paid only once, so the generated value added is multiple. Because a unit of public funds can be reallocated one-to-one independently from its payer (it is *fungible*), even without direct income transfers (a conspicuous form of redistribution), the question of sharing the burden optimally would still remain.[26]

The fundamental problem of the unequal burden (or just share) is that we have only imperfect observations of the characteristics underlying the ideal redistribution. If we only infer these characteristics from observed behaviour (value creation, consumption), we are bound to distort this behaviour. The canonical case is the following. We would like to put more of the burden on people born of higher ability, but we can only differentiate between people according to the compound effect of ability and effort (i.e. earnings). As a result, we will also distort (hinder) efforts, which is needless and costly. Ideally, taxes would only differ by ability (with the inevitable, even efficient, income effects); all other solutions can be compared to this baseline. On the other hand, the substitution effect, due to the changing returns on effort (viz. marginal tax rates) is a pure loss.[27]

In the basic case, to establish an optimal income tax scheme, we only need a few major statistics. First, the empirical distribution of income,[28] second, the social weighting of citizens of different ability, third, labour supply elasticities at different income levels, which determine distortions (*Diamond*, 1998; *Saez*, 2001; *Diamond and Saez,* 2011).[29] *Chapter 2* discusses these questions in detail.

25 *Besley and Persson* (2013) give an overview of the so-called fiscal capacity of political communities, and the proportionally bigger governments that advanced economies can maintain.

26 The iron logic of fungible tax payments implies that any income tax scheme corresponds to social weights that could rationalize it from the empirical income distribution and preferences (i.e. welfare inferred from elasticity estimates). This is how *Saez and Stancheva* (2012) endogenize social weights, in order to allow us to move forward in tax reform dilemmas even without assuming a social welfare function, or just to describe what social preferences and weighted individual marginal utilities could correspond to existing tax schedules.

27 A magisterial review of the recent literature is given by *Piketty and Saez* (2013), always paying attention to link the theory of optimal (but realistic) tax and benefit schemes to empirics. They also discuss tax evasion and income shifting, international migration, and rent seeking, with special attention to issues of relative incomes, the taxation of couples and children, as well as in-kind benefits. Finally the authors summarize which non-utilitarian alternatives we might move towards from the clashes between utilitarian conclusions and practice, intuition or consensus.

28 It is essential to know how many people would be affected by a tax rate change at a given income level, and how large changes for how many people would be allowed by a revenue-neutral change elsewhere.

29 *Lockwood and Weinzierl* (2012) make a remarkable aside: if some income differentials reflect differences in preferences (e.g. like ingrained drive), which the political community would respect (and not punish those who value material goods more and leisure less than others, e.g.), then the canonical recommendation would yield a too progressive tax schedule. *Werning* (2007) conducts a useful exercise instead of solving the utilitarian optimization program: he derives robust tests of the minimum requirements of Pareto efficiency for tax schedules, with flat taxes as a special case.

The tax base

It is a valid question why an unequal burden (a just split) is practical and common to accomplish by the taxation of income in particular. While incomes are relatively easy to register and aggregate by person, the purchase-by-purchase taxation of consumption would make it really cumbersome to levy different burdens on different transactions. This is why it is recommended to tie the unequal burden to incomes, with income taxes.[30] Because tax law can rarely distinguish goods the way the proposed redistribution (burden sharing) requires to distinguish their consumers, it is usually hopeless to achieve just redistribution with differential taxation of goods and services.[31] All in all, its administrative advantages[32] notwithstanding, value-added or consumption taxes (even with multiple rates) are unable to differentiate to a large extent, let alone aligned with the aims of the political community[33] (see Chapter 6 of *Mirrlees et al*. 2011, and *Scharle et al*. 2010).

The connection between earnings on the one hand and the most important characteristics for redistribution on the other is imperfect but tight and well documented in modern states. In comparison, even the most advanced bureaucracies do not link consumption data to citizens. Even in the realm of incomes, the state makes insufficient effort to link incomes with taxes and benefits, and the political community barely knows how it shares its burden and goods. The *Mirrlees Review* also recommends wholeheartedly the joint treatment of taxes and benefits, not only for administration but also for design and planning (Chapter 5 of *Mirrlees et al*. 2011). The linking should start with the registration of data already collected and opening it up for research (on databases already available in Hungary, see the Appendix of this chapter). Yet it would also be important to document transfers and in-kind benefits throughout the lifecycle.

Another classic question of the tax base concerns *family taxation*. If spouses share resources, including their income, this cannot be neglected by a just and efficient tax system either. Among corresponding optimal tax recommendations, the work of *Kleven et al*. (2009) stands out. It shows that observing the spouse's income on top of one's own improves the inference on ability. The solution also depends on whether two-earner families differ mainly by having lower fixed costs on the second earner's market work. This would justify a higher marginal burden on two-earner families, though to an extent which is declining in the income of the first earner. This actually lines up well with widespread practice of individual taxation, as in the United Kingdom, where joint family income is the basis for (means-tested) benefits, which are then faced out gradually. Since second earners' labour supply elasticity is higher empirically, they should still face lower average tax rates.

On the empirical side, *Gelber* (2012) conducted a thorough study of earnings reacting to a spouse's income and taxes. Investigating a large-scale Swed-

30 It is important to keep in mind that the main difference between the literature of optimal income taxes and optimal commodity taxes lies in the convention that the latter only assumes linear taxes with a single rate, while the problems of the former have always been more general, according to practice.

31 An exception could be the case of categorically distinguished luxury taxes, yet they cannot be expected to significantly change the share of the burden.

32 *Pomeranz* (2011) documents how the self-controlling, enforcing effect of value-added taxes spreads upwards in supply chains.

33 *Kaplow* (2011), in his comments on the *Mirrlees Review*, also uses the example of a uniform value added tax to highlight how right the authors were to argue for efficiency improving reforms in a redistribution-neutral fashion. In a systematic, holistic approach a reshuffling of income taxes and monetary transfers can always implement an arbitrary redistribution of resources.

ish reform, he found that a compensated tax cut would have (substitution) effects increasing both spouses' earnings. Yet he also points out that simpler measurements (not taking compensating changes or simply using total family income) would overestimate these elasticities; it is not true that for a spouse the other's earning would simply count as unearned income.

Taxes on capital income (e.g. interest, dividend or corporate taxes) distort choices between time periods, and as taxes on an important intermediate good, they needlessly distort production too (*Diamond and Mirrlees*, 1971a, 1971b).[34] This can be necessary only if higher ability people save more (probably because of self-control or patience) at any income level.[35] The distortion from capital taxes is enormous (*Chamley*, 1986, *Judd*, 1985), since such a tax leaves a compounding burden year over year on the same initial saving, eventually taxing infinitely the creation of this useful factor of production (initially saving and then accumulation).[36] This is why economic theory prefers the taxation of consumption instead of savings-inclusive labour earnings or total income. A tax on consumption (or expenditure) does not need to be linear or proportional though: only a tax collected on purchases (e.g. a VAT) needs to take the same proportion on each unit and consumer for administrative reasons. But a conventional income tax could also be viewed as a consumption tax if savings were tax exempt: then the remaining (spent) income can still be taxed individually, even progressively (see Chapters 13 and 14 of *Mirrlees et al*. 2011).[37]

It is particularly relevant to the labour market effects of the tax system that human capital accumulation is similarly punished by conventional labour income taxes.[38] *Best and Kleven* (2012) also showed that allowing for learning and human capital investment results in a less progressive optimal tax system. Remarkably, they recommend age-dependent tax rates and an easier burden on older workers for the same reason. *Gelber and Weinzierl* (2012), however, derive and calibrate opposite results because of the intergenerational nature of this accumulation: even at the cost of larger redistribution and static distortions it is beneficial to incentivize the investment in the skills of children in low-income families.[39]

Distinctions beyond income?

We can give two main justifications for differential taxation (in addition to income). First, more directly, the political community can deem other types of differential burdens just. For instance, it can support values or preferences on top of ability; like certain consumption bundles (merit goods), rural residence, or childbearing.[40] Nonetheless, the tax authority is just as unlikely to observe the other characteristic perfectly, thus the inference or filtering problems become multidimensional, which can be rather complicated and counterintuitive.

34 More generally, the recommendation is uniform intermediate taxation.

35 The general argument of *Atkinson and Stiglitz* (1976) has been adapted to this case by *Saez* (2002) and recently calibrated by *Golosov et al.* (2012).

36 *Saez* (2013) makes an important clarification though. A progressive capital income tax would only tax large incomes highly until they fall back to the tax-exempt bracket. This implies no infinite burden. Such capital taxes can have a place in an optimal tax system (even without the lump-sum redistribution of initial wealth).

It is still an empirical question whether capital accumulation responds to this distorted price. Long-term measurement is very difficult. *Piketty and Saez* (2012) rationalize capital taxes with expecting small responses in reality.

37 Or a progressive tax system entirely on labour can still be equivalent to such a system, if we can determine the fraction of returns to capital that depended on effort (like the profit of small enterprises being labour income). *Feldstein* (2012) argues against the tax on "consumed income" preferred by *Mirrlees et al.* (2011) with its more complicated accounting.

38 Equally for physical as well as human capital, it would be paramount to separate pure interest from returns to effort, both at times of investment and later. Effort generates original income and should be taxed by labour income taxes.

39 *Kopczuk* (2013) reviews inheritance and related taxes. *Piketty and Saez* (2012) discuss capital taxes justified as annuities on redistributed wealth that would compensate for the good or bad luck of more or less generous forebears.

40 Distinction not by need (e.g. sickness) or resources (e.g. income, wealth) but by some choice is often labeled paternalistic. For in-kind benefits, these are sometimes defensible as corrections of externalities or so-called internalities. It is an internality for example if the citizen, admitting his own frailty and ignorance, wishes to substitute for his self-control with mandatory savings of the pension system or compulsory schooling. For more detail on this, see *Bernheim* (2013) on the applications of behavioral economics to public economics.

Second, some other observable characteristics can simply help with the original inference problem: if other information (gender, age, or height) can make the inference from income to ability more precise, only practical reasons can justify their negligence.[41] The filtering problem can be improved in two different cases. First, if the observable factor drives changes in the ability distribution, e.g. the labour market values the skills of the middle-aged or tall people more highly. Second, if different preferences change how the same skills will be turned into earnings in different groups, e.g. mothers of young children, the elderly, or the disabled are more sensitive to income in giving up their leisure, and thus have a more elastic labour supply. This kind of *tagging* can be so efficient that the main question of this literature is why the state does not use it more.[42] Labour market effects can be seen as the mirror image of the same reasoning: without this optimal tagging, some people work too much, while others work too little.

Abilities also change sharply over one's career. This has been discussed more boldly in the literature, perhaps because most of us visit both the peaks and troughs sooner or later. The canonical model of optimal income taxation (*Mirrlees*, 1971) is static, and can at best correspond to taxing overall lifetime earnings differentially. But for the calibration of such a system, short-term measurements are misleading. Not only are measurements of such responses (thus elasticities, thus preferences) dubious, lifetime incomes are simply rarely collected; so they could not constitute a tax base in practice, nor could their distribution help calibrate an admittedly imperfect annual income tax system. Though it has been know since *Vickrey* (1939) that the current annual income tax system is not neutral in the timing of earned income (e.g. it underincentivizes work over shorter careers), this is a significant distortion even today: a time-neutral tax could have 11% less deadweight loss (*Liebman*, 2003). Moreover, savings can help to game the annual income tax system at older ages – or as a precaution, society is bound to design a weaker filter, a less efficient tax system. Meanwhile, earning abilities genuinely change over one's lifetime, and some insurance against career risks would surely be valuable.[43] Early retirement or disability insurance is already one form of this; its current forms though are ripe with perverse incentives.[44]

Among the most important proposals, *Farhi and Werning* (2011) approximate an optimal earnings history-dependent income tax system with one where labour taxes change with earnings and consumption (saving). Their important finding is that a simple age- (but still not history-) dependent labour and capital income tax scheme can be a fairly good approximation to the optimal system, while still offering significant welfare improvements over the current practice. Even more, the relatively high (optimal) capital taxes they derive have only second-order benefits relative to those of age-dependent correction of labour taxes. The biggest welfare gain relative to a simple tax system would come

41 The line continues with the income or wealth of family members, or age.

42 The moral reasoning for the absence of tagging have been translated into a transparent economic model by *Weinzierl* (2012). Here the political community also puts some weight on the principle of *equal sacrifice* (originating at least from John Stuart Mill), not only on utilitarianism, thence only the obviously informative tags implying significant productivity loss (disability, blindness, old age) will be used, weaker ones (height, gender, skin color) not. Without this, the standard utilitarian social welfare function would yield a so-called inverse Euler equation: all distinguishable groups should have their expected value of the reciprocals of marginal utility of consumption equalized – which is just the cost of increasing the utility of each group.

43 On the reasons and recommendations for dynamic taxes, see the review of *Diamond and Werning* (2013).

44 *Golosov and Tsyvinski* (2006) calculated significant welfare gains from means-tested disability benefits.

from an upward-sloping age profile of personal income tax rates. Though the authors of the *Mirrlees Review* would only tag because of different elasticities, an age-dependent tag is their only recommended complication too: an extra lower rate for the young and those before retirement in an otherwise simple (broad-based, low-rate) tax proposal (Chapters 3 and 4 of *Mirrlees et al*. 2011).

Finally, we need to mention an important spatial effect of taxation, the distortion of *amenity* levels and corresponding mobility rates and house prices (*Albouy*, 2009). Because income taxes are uniform in nominal income within a country, the local price level introduces differences in the real burden, which can be not only unjust, but also represent a costly distortion of real estate prices and residential choice.[45] What is more, uniform taxation of real earnings (some cost indexation) would not be a perfect solution either: it would not overtax productivity differences in space anymore, but undertax regions which are recognised as having lower real wages because of their more pleasant environment. *Albouy* (2009) calculates that the welfare losses of the current system can be as much as 0.23% of incomes; though it is questionable how relevant this calculation is for Hungary.[46]

APPENDIX

Hungarian databases used for empirical research

MÓNIKA BÁLINT

The state covers most of its expenses through the collection of taxes. Taxation changes the behaviour of economic actors (it has an impact on labour demand and supply, consumption and saving) and re-allocates income between different groups. The implications of changes in taxation and welfare provisions are complex: they are best quantified by empirical research using micro-level data. This chapter provides a brief overview of the characteristics of databases with individual-level data, their analytical possibilities, limitations and accessibility.

Data from personal income tax returns, National Tax and Customs Administration

According to the provisions of Act CXVII of 1995 on personal income, in Hungary individuals must declare their income to the tax authorities each year, using the form xx53.[47] The income tax database of the National Tax and Customs Administration (in Hungarian: Nemzeti Adó- és Vámhivatal, NAV, before 2010: Tax and Financial Control Administration, in Hungarian: Adó- és Pénzügyi Ellenőrzési Hivatal, APEH). includes information from tax return forms – in the same format – namely: personal identification (sex, date of birth, place of residence), total income (combined tax base), tax liability on

45 Free choice of residence is a key issue of urban public finance, reviewed by *Glaeser* (2013).

46 Albouy's US results might be hard to extrapolate to Hungary, due to larger mobility in the US. Yet with the wide range of urban and rural final goods and real estate prices, it still seems imaginable that the uniform nominal tax and benefit system generates mobility which significantly rearranges the labour market. And the tax treatment (exemption) of owner-occupied homes (the implicit rent) distorts housing demand, while building regulation affects housing supply: both distort real estate prices and mobility.

47 "xx" indicates the last two digits of the tax year for which the tax return was submitted.

the combined tax base, any deductions and allowances reducing tax liability on the combined tax base, other data, tax liability for the given year, calculation of public contributions (simplified contributions), any overpayment of health care or pension contributions, and special tax payments.[48]

The advantages of the database compared to survey-type databases is that it includes all tax payers – in this case 4.3–4.6 million people[49] – and therefore with the appropriate sampling techniques it is possible to obtain an unbiased sample. Using the tax and the social insurance numbers – which identify each individual tax payer – it is possible to create longitudinal datasets by integrating data from various tax years or even integrating different databases that use the same identification (such as contribution payments, family and other benefits etc.) (*Benedek*, 2008).

Limitations, disadvantages. The fact that the database is based on self-reported information and does not have any information on amendments by the taxpayer or amendments following an inspection by the NAV makes data cleaning for the study of behavioural implications more difficult and it might bias results when computing real income. A further limitation is that the tax return forms provide no information about the occupation or the industry of the tax ayer (only the self-employed are required to indicate this), and it is not possible to identify employment that lasted less than a year. Forms prior to 2008 did not include information about gender; the tax authority addressed this by adding a new variable that deducted gender using the first name (however this did not provide complete coverage). Another disadvantage of the database is that it does not show the real income of tax payers: it only includes taxable income that is reported to the authorities. Furthermore it does not provide information about the characteristics of families or households (*Benedek*, 2008).

Access. Before Act CI of 2007 (on access to data) personal income tax data was not easily accessible. Although the Ministry of Finance (in Hungarian: Pénzügyminisztérium, PM), as a supervisory body, usually had access to the requested information, nevertheless it was not possible to integrate the information with data from other sources (*Benedek*, 2008). However the Act strengthened the rights of those requesting data and it stipulated that data must be made available for impact assessment and research aimed at facilitating decision-making. In the case of databases covering the whole population, the maximum size of the sample can be one half of the total population and once information has become public data, it must be freely available to anyone. The dataset used by *Kiss and Mosberger* (2011) will soon be available from the National Info-communication Agency (in Hungarian: Nemzeti Infokommunikációs Szolgáltató Zrt., NISZ); however other datasets have not yet been turned into public data.

Publications using the NAV database. Bakos, Benczúr and Benedek (2008) examined the impact of average and marginal tax rates on the elasticity of in-

48 Based on the tax return form for 2011.
49 Source in Hungarian: *NAV*.

come – and in the same study – assessed the potential implications of the introduction of a flat-rate tax system. The study used a five per-cent sample of income tax returns submitted for the tax year 2004, and merged this with 2005 tax return information for each individual in the sample. *Kiss and Mosberger* (2011) assessed the impact of the "extraordinary tax" introduced in 2007 on the taxable income of high earners using income tax data from NAV: out of the total population of tax payers in 2005 they selected a 10% sample – excluding the self-employed – and integrated this with data from 2006–2008. *Benedek and Kiss* (2011) integrated a 10% random sample of income tax returns from 2008 with the Household Monitor Survey (in Hungarian: Háztartásmonitor-felvétel) of Tárki and used a microsimulation method to estimate the impact and cost of tax reform measures. *Benedek and Scharle* (2006), *Benedek and Lelkes* (2005) and *Ecostat* (2009) also applied microsimulation methods using income tax databases.

Household Budget and Living Conditions Survey, Hungarian Central Statistical Office

The history of the Hungarian Central Statistical Office's Household Budget and Living Conditions Survey (in Hungarian: KSH Háztartási költségvetési és életkörülmények adatfelvétel, HKÉF)[50] goes back to many decades: until 1983 it was carried out on a yearly basis, then every odd year between 1983–1993, and again yearly since 1993. The HKÉF is a representative survey of Hungarian households and aims to provide information about – financial and in-kind – income and expenditure. Thus the survey provides a wide range of information about work, social and capital income, as well as the amount and value of goods and services consumed by households. However it has limited information about educational attainment, economic activity and even more limited information about savings, indebtedness and wealth. The datasets – depending on the year – contain information about 20–26 thousand individuals living in 7.5–10 thousand households. Data is collected using a retrospective interview and a diary or log method. Since 1993 approximately one third of the households in the sample is replaced each year (however in practice this does not always happen), therefore about one third or one fourth of the households remains in the survey for three years (*Molnár,* 2011).

Limitations, disadvantages. The survey does not include marginal groups (the homeless, the poorest and the richest) therefore the database in its "raw" form does not provide a complete and accurate picture of the whole income distribution. Some economic and social changes had negative implications for the validity of HKÉF, both in terms of response rates and underreporting of income and in some cases consumption. When working with the data, it must be taken into account that young people, Budapest residents, people with higher

50 Until recently KSH used the title Household Budget Survey (HBS in Hungarian: KSH Háztartási költségvetési adatfelvétel, HKF).

education, the economically active and the self-employed are under-represented in the sample. People of pension age, pensioners and the unemployed are over-represented (*Molnár,* 2011).

Access. Anonymous datasets can be obtained from the KSH for research purposes or accessed in the HCSO's research room[51] following registration and approval of the data request.

Publications using the HKÉF. Cserháti et al. (2007, 2009), and then *Benedek, Elek and Szabó* (2009) and *Benczúr et al.* (2011) used the database for microsimulation modelling. *Benczúr et al.* (2012) used it for a structural labour supply model.

Integration of databases managed by the Central Administration of National Pension Insurance, National Health Insurance Fund, the Hungarian State Treasury, and the National Labour Office (Ministry for National Economy; Institute of Economics, Research Centre for Economic and Regional Studies, Hungarian Academy of Sciences)

The relevant data integration was initiated by the Ministry of Finance (in Hungarian: Pénzügyminisztérium; the predecessor of the Ministry for National Economy, in Hungarian: Nemzetgazdasági Minisztérium, NGM): a sample of 200,000 individuals was selected from the 2001 Population Census that included information on gender, age and place of residence, then using these parameters a random sample was selected from the Social Insurance Number database of the National Health Insurance Fund (in Hungarian: Országos Egészségpénztár, OEP). Then using anonymous codes data on the use of health services, sick leave and child care allowance[52] from the databases of the OEP, data on employment history, income and pension from the database of the Central Administration of National Pension Insurance (in Hungarian: Országos Nyugdíjbiztosítási Főigazgatóság, ONYF) and information on child care benefit,[53] maternity allowance[54] and child benefit were linked. The sample includes longitudinal data from 200,000 individuals for the period between 2000–2007 (*Elek et al.* 2008).

The Institute of Economics (the predecessor of the Research Centre for Economic and Regional Studies, in Hungarian: Közgazdaság- és Regionális Tudományi Kutatóközpont, KRTK) proposed the creation of a database that covered less information, however with a larger sample size than the database of the Ministry of Finance for research on labour market forecasting in 2010. The sample was selected by the OEP from the Social Insurance Number database using random sampling: the sample consisted of half of the total population aged between 15–74 years in 2002. The dataset created by the OEP contains demographic information, the code for health insurance status and its duration, duration of any benefits or services and their code for the period of

51 KSH research room.

52 This is a contribution-based maternity pay that can be claimed up to the second birthday of the child.

53 Contribution-based benefit paid for the first six months of the maternity leave.

54 This is a universal benefit that can be claimed up to the third birthday of the child.

2000–2009. The dataset from ONYF includes, in addition to demographic information, pension qualifying service (code and duration), any periods without contribution payment and occupation groups (in Hungarian: FEOR). Information from the job seekers' register of the National Labour Office (in Hungarian: Nemzeti Munkaügyi Hivatal, NMH) as well as data on unemployment assistance and information on family benefits (child care allowance etc.) and the number of children from the Hungarian State Treasury (in Hungarian: Magyar Államkincstár, MÁK) were integrated in the database.

Limitations, disadvantages. Research possibilities are limited by the fact that information on educational attainment is only available for the unemployed and the FEOR code (from which information on education could be inferred to some extent) is missing for people with certain status codes. The reliability of the databases is somewhat compromised by the fact that different datasets – or sometimes even the same dataset – provide inconsistent information about individuals, and these problems cannot always be resolved. A further uncertainty in the analysis is that the dataset of the OEP contains information about many insurance relationships that have already ended, but without information concerning their end date. Finally, the usability of the KRTK dataset is also limited by the fact that the sample has not been supplemented since its creation and it has no information about those aged under 15 or over 75 years.

A disadvantage of the KRTK dataset compared to the dataset of the Ministry of Finance is that while the latter had information about the children for whom family benefits were claimed, the KRTK dataset computed the number of children from eligibility for child benefit at a given time point that is not reliable due to the algorithm used. The OEP databases have only included all people claiming contribution-based maternity allowances since after 2006.

Finally, the possibility of the renewal of datasets is limited by the law: it is not possible to link additional data to anonymous dataset, therefore to extend data longitudinally sampling and the resource-intensive data cleaning must be repeated.

Access. The Ministry of Finance's database can be accessed through the Ministry for National Economy, the successor of the Ministry of Finance. In order to access the database approval must be obtained from the head of the Department for Macroeconomy in the State Secretariat for Taxation and Financial Policy Affairs. The "raw" KRTK database can be accessed by anyone through the National Info-communication Agency. The cleaned version is available from the Data Bank of KRTK – as a general rule for collaborative research projects with KRTK staff and upon approval by the director of the Data Bank.

Publications using institutional databases and areas for future research. The aim of the creation of the Ministry of Finance's database was to assess the targeting of social insurance assistance. Moreover – due to its panel structure

which provides longitudinal information about individuals over a period of 6–8 years – it is also suitable for the analysis of the flow between different labour market statuses, eligibility for different assistance and their relationship (*Scharle,* 2008). Furthermore, information about the total taxable income also makes it suitable for the analysis of income distribution and trends in individuals' wages. Compared to other administrative databases, the main advantage of the ONYF database is that it not only provides information about people who have worked for at least one day regardless of the duration of the total employment period; however, information about the duration of employment also allows the computation of the average number of people in employment on any given day.

Comparing the data of those employed lawfully with population surveys – using a discrepancy method – it is possible to estimate the prevalence and characteristics of grey and black employment (see for example: *Augusztinovics and Köllő,* 2007, and *Chapter 6*). In addition the KRTK database, due to its large size, is especially suitable for the selection and analysis of smaller sub-samples (for example to study the impact of the duration of labour market statuses on income/transfers).

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2. THE ELASTICITY OF TAXABLE INCOME

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The goal of this chapter is threefold. First, it surveys the relevant international literature, focusing on its most policy relevant aspects. Second, it reviews the results of two previous estimations of the elasticity of taxable income using Hungarian data (*Bakos et al.* 2008, *Kiss and Mosberger,* 2011). Finally, it investigates how the estimated elasticities can be used in simulations of the "optimal tax system".

The state of the international literature

The original literature

The literature on the elasticity of taxable income was initiated by the seminal paper of *Feldstein* (1995) analyzing the 1986 US tax reform. *Saez et al.* (2012) provide a review of the development of the literature. The elasticity of taxable income is the parameter that quantifies by how much an individual's taxable income increases if their marginal net-of-tax rate (their "tax price" or 1 *minus* the marginal tax rate) increases by one percent. While Feldstein's results suggested that this parameter can exceed one, later works like that by *Gruber and Saez* (2002) suggest that the elasticity is most likely to be around 0.4 for the United States. It is worth noting that calculations by *Kiss and Mosberger* (2011) suggest that an elasticity of 0.4 in Hungary would imply that an increase in the actual top personal income tax rate in 2010 would have resulted in decreased tax revenue, that is, Hungary would have been on the "wrong side" of the Laffer curve.

The major part of the literature, following *Feldstein* (1995), uses variants of the "difference-in-differences" method to estimate the elasticity of taxable income. His study was the first to use anonymous individual income tax returns to analyse whether the taxable income of groups who experienced the most significant tax cut grew at the highest rate. The methodology saw improvements in proportion to the quantity and quality of available data: *Auten and Carroll* (1999), and *Gruber and Saez* (2002) conducted a regression analysis comparing individuals rather than raw group means, and were able to control for demographic characteristics of individual taxpayers. Still, their method, like Feldstein's, is based on the difference-in-differences methodology focused on whether taxpayers who are affected differently by the tax reform also show a differential response.

The difference-in-differences method would work ideally in an experimental setup: in that case, the researcher would divide the sample randomly into a treated group and a control group in a way that the two groups are perfectly indistinguishable from each other before treatment. When assessing tax reforms we can almost never reach this ideal setup because the tax system always differentiates between taxpayers based on observable criteria.

When, for instance, the researcher estimates the effects of the introduction of a new tax bracket by comparing the change of the behaviour of taxpayers above and below the relevant income threshold, one can raise the criticism that taxpayers in both groups behave differently simply due to their original income differences: the group above the threshold behaves differently because they had a higher income in the first place. The literature formulates this criticism in terms of two econometric issues. The first issue is "regression to the mean", which is thought to affect mostly taxpayers with very high (or very low) income. In every year, some of the high-income individuals are just experiencing a one-time windfall, which is most likely be followed by a decrease in income in the following year. It is possible that the income growth of two income groups differ only because of this phenomenon and not because of the different tax changes affecting them. The second econometric issue (having the opposite effect) occurs if the income distribution becomes more dispersed due to the nature of economic-technological developments and we wrongly attribute this development to a tax reform. The literature, following *Auten and Carroll* (1999) and *Gruber and Saez* (2002), deals with this problem by including (log) initial income (i.e., taxable income in the period before the tax change) as a control variable in the regression explaining income growth. This method, at least in principle, properly deals with gradual changes in the income distribution as well as gradual differences between groups related to the phenomenon of regression to the mean.

There is another reason why the analysis of tax reforms does not conform to the ideal experimental setup: individuals can switch from the control group to the treated group, and vice versa, as a consequence of their decisions or chance. This happens if a low-income tax payer becomes a high-income taxpayer (or the other way round) independently from the changes in the tax code. Such events are common as taxpayers get promoted, switch jobs, move, or experience other changes in their work conditions due to reasons unrelated to tax reforms. These switches between the treated and control groups introduce a bias into the estimation procedure. If an individual's income increases and, due to this fact, a higher tax rate applies to them, then we may wrongly conclude that their income increased *as a consequence* of the higher tax rate. The literature solves this so-called "reverse-causality problem" by using the instrumental-variable (IV) estimation procedure. The instruments are constructed by applying the after-change tax rules to the individual's original income (inflated by the av-

erage wage growth). This tax rate, based on the so called "synthetic income", is only dependent on the changes of the tax system and not on the taxpayers' random income fluctuations or decisions.

Although the literature – including the two studies on Hungary we present in detail – typically uses the difference-in-differences estimation method, it is worth breafly summarizing a second method that employs a different strategy. (A third type of strategy which uses "kink points" and "notches" of the tax function to identify the elasticity will be discussed later on in the chapter.) This second estimation methodology is based on the simple statistic of the share of total income earned by the top one (or five) percent of taxpayers. If this statistic is available for a long time period then it can be related to the marginal tax rate of top earners during this period. In the United States, for example, the top one percent earned an almost constant 8 percent of total income during the period before 1980. The income share of the top one percent started to increase during the period of two tax reforms that decreased the marginal tax rates for top earners during the Reagan administration to reach 12 percent of total income by 1990. This, as *Saez et al.* (2012, p. 19) highlight, is an indirect, but quite persuasive argument for the existence and significance of the taxable income elasticity.

Studies using this methodology cannot ignore the question of how the top income share would have evolved if the tax system had remained unchanged. The importance of this question can be well illustrated with an example from the US: top marginal tax rates were increased during the Clinton administration but top income shares continued to climb in the 1990's following a temporary drop, reaching 16 percent in 2000. *Saez et al.* (2012) show that the method of controlling for the time trend significantly affects the estimated elasticity: the time-series method, without controlling for the trend, gives a parameter estimate of 1.7 while the estimate is only 0.6–0.8 when the trend is controlled for.

Saez and Veall (2005) obtain a high elasticity parameter (0.8–1) by applying the same time series method to eight decades of Canadian data. The interesting result of the paper is that they obtain a much lower elasticity (approx. 0.3–0.5) when they include as an explanatory variable the top income share in the United States. According to the authors it is possible that the surge in top incomes in Canada in the last decades of the 20th century was influenced by similar developments in the US, due to the threat of the brain drain: firms may have had to offer higher wages in some specific occupations in Canada to prevent workers from taking up work in the US.

Another version of the top income share method gives a different answer to the question of what benchmark the growth in the top income share can be compared to. *Brewer et al.* (2008) analyse the development of top income shares and its relationship with tax changes on four decades of British data. Their study compares the income share of the top one percent to the income

share of the next four percent (taxpayers belonging to the 95th to 99th percentiles) taking into account the respective tax rates of both groups. The estimated elasticity is 0.46 (approximately one-third lower than estimated without a control group). This method is accurate only if we can assume that the income share of the top one percent and the next four would have increased at an equal rate absent any tax changes. If technological change favoured the top one percent compared to the other high earners, then the estimation will be biased upwards *(Saez et al.* 2012).

Other countries

Following the seminal papers analyzing US data, a large number of estimations have been conducted on other countries. In most countries the estimated elasticity of taxable income is lower compared to the parameter estimated for the United States. Most economists think this is due to differences between the tax systems rather than differences in preferences or behaviour between countries.

The argument that the elasticity of taxable income is a function of the tax system and, in particular, the definition of the tax base, has been theoretically established by *Slemrod and Kopczuk* (2002), and was empirically supported by *Kopczuk* (2005) in his analysis of US tax reforms. If there are many types of deductions in the tax system, then taxpayers have many opportunities to influence their tax base – either through an adjustment in real activities or through relabeling unchanged activities. In this case we will find a high estimated taxable-income elasticity parameter. As *Slemrod and Kopczuk* (2002) highlight, this manipulation of the tax base is a social waste since it is unproductive. This means that, in general terms, a tax system with fewer deductions and exceptions to its tax base (i.e., a tax system with a "broader" tax base) is less distortive and is therefore better for social welfare.

International studies give support to this assumed relationship between the tax system and the elasticity of taxable income. There are relatively many types of deductions in the German tax system. The only existing estimate of the elasticity of taxable income on German data (*Gottfried and Witczak,* 2009) finds a relatively high taxable income elasticity (between 0.4 and 1, depending on the specification). But most studies on other countries obtain an estimated elasticity parameter between 0 and 0.3. For example in a recent study on Danish data, *Kleven and Schultz* (2012) estimate an elasticity of 0.05 for wage income and 0.01 for the income of the self-employed. In Denmark the tax base is very broad, the possibility of tax base allowances and deductions is restricted, and double income reporting is widespread (both employers and banks report the individuals' income to tax authorities). This interpretation is supported by the fact that US studies find that broader definitions of income (e.g., before deductions) react less sensitively to tax rates than taxable income. *Gruber and Saez*

(2002), for example, estimated the elasticity of taxable income to be about 0.4, while they found an elasticity of about 0.1 for a broader concept of income.

Further patterns can be deduced from the international literature. The estimated elasticities may, for example, differ between different groups. According to a few studies the income elasticity is higher for those groups who have more possibilities to shift their income either between time periods or income sources (entrepreneurs, high income individuals). This is supported by estimations of *Sillamaa and Veall* (2001) on Canadian data, *Pirttilä and Selin* (2011) on Finnish data and *Ljunge and Ragan* (2004) on Swedish data. Another study on Swedish data, *Blomquist and Selin* (2010) provides estimates separately for men and women. They can observe not only the taxpayers' annual income, but also their hourly wage. According to their estimates the hourly wage elasticity of males is around 0.15, while it is around 0.5 for women. When the authors analyse the elasticity of wage income, the income elasticity of males is around 0.2, while it is above 1 for women.

The estimated elasticity may also depend on the time horizon of the analysis. On the one hand it is possible that the adjustment of taxpayers takes time. On the other hand, it is also possible that taxpayers merely shift the timing of some of their activities: in this case there is a short-run elasticity but the real long-run effect is zero. *Holmlund and Söderström* (2007) use Swedish tax rate changes from 1995 and 1999 to differentiate between the short and long run elasticities by including the tax rate changes of the current year and the previous year as control variables. While the estimated coefficient of the current tax change is not significantly different from zero, the effect of the previous year's changes is between 0.22–0.32, suggesting that the long run elasticity is higher than the immediate one. *Giertz* (2010) obtained similar results, while *Heim* (2009) found only short run elasticities. However, the results should be interpreted with caution, because – mainly due to the way of controlling for the initial income – they are typically sensitive to the specification (*Saez et al.* 2012).

Finally, the magnitude of the estimated elasticity may depend on the extent of the tax reform. According to *Kleven and Schultz* (2012) the estimated elasticity is larger in the case of larger tax reforms, probably because smaller tax changes go unnoticed by many taxpayers, and also because there is more to be gained by adjusting optimally to a larger tax change. Taxpayers' inattention or adjustment costs may thus create frictions in the adjustment process. The availability of tax return data encompassing a quarter of a century makes it possible for Kleven and Schultz to compare the effects of large and small tax reforms. The estimated elasticities support the theoretical predictions: the estimated elasticity of wage income is 0.12 for the 1980's, while for the 1990's – the period of smaller tax changes – the same elasticity parameter is only 0.02. If the decision-friction assumption is correct, then the effect of the larger tax reforms is closer to the actual long-run taxable-income elasticity.

Decision frictions and mistakes

A recent strand of the literature devotes special attention taxpayers' (either rational or irrational) inattention and mistakes. This line of research promises to reconcile two conflicting notions, both of which are persuasive in their own right: on the one hand, economists think that taxpayers in general do react to material incentives, while on the other hand most taxpayers do not make time-consuming calculations in order to re-optimize their taxable income to new tax regulations each year. This may have two reasons: lack of information and lack of control. On the one hand, not all taxpayers know important details of the tax system (most people probably do not know even their marginal or average tax rate). But even if all taxpayers had all the information, the majority would not have total control over their taxable income and its composition.

The so called kinks and notches of the tax function provide a great opportunity to analyse the behavioural patterns behind the estimated elasticities. Kinks of the tax function – and the taxpayer's budget line – appear when the taxpayer's marginal tax rate changes at a given income level. Rarer in modern tax systems are notches: income levels at which there are discrete jumps in the tax payable. *Saez* (2010) made an early attempt to identify the taxable-income elasticity from the "bunching" of taxpayers at kink points of the tax function. The more taxpayers bunch at kink points, the more optimizing taxpayers there are and the higher is the elasticity. The results show a relatively limited bunching behaviour of taxpayers, suggesting a lower elasticity than that which researchers find when analyzing tax reforms. The result is consistent with the concept that taxpayers do not consider the kinks of the tax function as important enough to pay attention to them.

Probably *Kleven and Waseem* (2013) are the first to have analysed taxpayer behaviour at notches of the income tax function. They exploit a rare feature of the tax system of Pakistan: when an individual passes the threshold of a higher tax bracket, their new tax rate is not only applied to income above the threshold but to their total income. This means that at each bracket threshold the *average* tax rate of taxpayers increases; thus at each threshold, the net income of an individual is reduced. Notches create a strong incentive for taxpayers to remain just below the next bracket threshold. Accordingly, tax return data from Pakistan reveals more significant bunching below the thresholds than is observed below kink points in other countries. At the same time the proportion of taxpayers who could increase their net income by reducing their gross income is not negligible. Their presence suggests that there are several taxpayers who are not, or at least not in every year, able to optimize their taxable income according to the tax system.

There are several factors that may hamper the adjustment of taxpayers. According to *Chetty et al.* (2010), optimal behavioural responses to tax changes are hampered, among other things, by the costs related to switching jobs, and restrictions on working time set by employers. They find support for this hypothesis on Danish data. Besides these factors, lack of information may also induce frictions as not all taxpayers are aware of the opportunities offered by the tax system. Based on an experiment involving tens of thousands of individuals in the US, *Chetty and Saez* (2012) showed that those who received advice from consultants on their tax declaration took advantage of more deductions than their counterparts who received no such advice. *Chetty et al.* (2012) find that even the location of residence of taxpayers might affect the extent of their tax optimization behaviour. The authors detected significant territorial differences in the bunching density at the kink points of the tax function which appears to be related to how well-informed taxpayers are in different geographic areas about the details of the US Earned Income Tax Credit (EITC). The authors find that the tax deductions of those people who moved from a "less informed" area to a "more informed" one increase, while in the reverse case the claimed amount of deductions does not decrease. This lends further support to the explanation that the effects are generated by the changes in the taxpayers' knowledge.

The study of decision frictions and mistakes is a relatively new area in the analysis of the effects of taxation which makes it difficult to draw final conclusions. The field promises to help us understand what kind of behavioural patterns are really behind the estimated aggregate elasticities. This can help us give better forecasts about the effects of tax reforms (better understanding the difference between short-run and long-run effects), but also to learn more about the welfare effects of taxation.

What is behind the elasticity?

One of the most important questions in the study of the taxable-income elasticity is what behavioural responses are behind the estimated elasticities: to what extent can the results be explained by real labour supply adjustment, and to what extent can they be explained by tax optimization or tax avoidance? Here we review the literature of other countries; we will revisit the question in the next section which discusses existing estimation results for Hungary.

Before the appearance of the literature on the taxable-income elasticity the focus of researchers was on whether tax changes affect the working hours of individuals. These studies found that men's working hours do not react very sensitively to tax changes, while women's labour market participation and working hours react slightly more sensitively (*Feldstein,* 2002, *Meghir and Phillips,* 2010). *Moffitt and Wilhelm* (1998) found that even though high-income men's working hours are inelastic, their total earnings do react to tax reforms, suggest-

ing that real labour supply changes may have occurred either in non-reported overtime, or in other aspects of work effort that are even harder to measure.

Another strand of the literature showed that dramatic changes in reported income were specifically due to tax optimization. *Goolsbee* (2000), for example, showed that the behavioural effect of the 1993 US tax increase on high incomes was mainly due to the fact that executives exercised more of their stock options right before the tax rate increase. In this case, a significant part of the behavioural response did not have to do with the adjustment of labour supply.

Taking into consideration the results from other countries we may conclude that, although tax optimization does play an important role in some cases, the overall evidence does not support a view that labour supply adjustment does not play a part in the estimated elasticities. On the contrary, the more moderate estimates of the taxable income elasticity are not much higher than estimates of the elasticity of working hours to tax changes. These in turn may underestimate labour supply adjustment as they do not take into account the changes in work effort.

Results from estimations for Hungary

This section presents re-estimated results of the study of Péter Bakos, Péter Benczúr and Dóra Benedek (*Bakos et al.* 2008; henceforth BBB) and the results of the study by Áron Kiss and Pálma Mosberger (*Kiss and Mosberger,* 2011; henceforth KM). First, we briefly review the data and tax reforms used by both studies. We also investigate in detail how the studies identify the estimated effects. Then we survey the results in three respects. First, we discuss what control variables should be included in the regressions. Here we will focus on initial income (to treat the mean-reversion problem), the average tax rate (to control for the income effect) and demographic characteristics (to control for the different income trends of specific taxpayer groups). Second, we discuss how the elasticity of taxable income depends on the income level. Finally, we turn to the question of to what extent we may consider the estimated elasticities as reflections of labour supply adjustment.

Data and tax reform episodes

Both studies use samples of individual tax return panel data compiled by the tax authority (APEH at the time of the research, NAV today). The data set was originally prepared for the Ministry of Finance, but was also used by the Office of the Fiscal Council. The database contains data from the tax return form xx53 for the respective years (as before inspection). The anonymous random samples were selected by the tax authority as follows. For the BBB study a sample of 250,000 individuals was selected from 2004 data (approximately 5 percent of all taxpayers), and then the 2005 data was added for the same individuals. For the KM study a 10 percent sample was selected from 2005 data

and tax files for the same individuals for three subsequent years were added. Sample attrition is a common phenomenon in similar analyses. In our case it is not significant because a significant part of the inactive population files a tax return either because they work for some months or because some of the social benefits they receive are taxable (e.g., some unemployment and maternity benefits).

The 2004–2005 tax reform reduced the number of tax brackets from three to two, increased the employee tax credit, raised the pension contribution ceiling, and introduced income dependent phase-out regions for some tax credits, raising marginal tax rates for those in the phase-out regions. These generated significant changes at all income levels both in the marginal and in the average tax rates; this allowed the authors of the BBB paper to obtain relatively precise estimates for a wide range of income.

The difference-in-differences estimation strategy identifies the effect of the marginal tax rate based on tax changes that affect the tax rates of similar taxpayers differently; in the language of econometrics, this difference in the "treatment" of different individuals is called exogenous variation. Changes in the income of individuals that are unexplained by observables also result in the change of tax rates, but this constitutes endogenous variation. Tax reform episodes, in turn, induce changes in the tax rates of individuals that are not due to their behaviour, thus providing exogenous variation.

In 2005, such exogenous variation at lower income levels (up to 2.5 times the annual minimum wage – thus including about 60 percent of income earners) was provided by the elimination of the middle tax bracket and the phenomenon of bracket creep.[1] In the top 40 percent of the income distribution the main source of exogenous variation is the bracket creep; but the changes regarding the phase-out rules of tax credits also caused variation in the tax rates.[2] The phase-out of various tax credits introduce a variation in the tax rates across individuals which is independent of initial income, thus allowing a separate identification of the effect of the marginal and average tax rate as well as that of initial income. Additionally, both the employee tax credit and other tax credits were phased out as a function of "total annual income", an income definition that is broader than "taxable income" by also including (among others) capital income. This provides further variation in the change of tax rates that is not perfectly correlated with initial taxable income.

Focusing on the top 20 percent of the income distribution (annual taxable income of HUF 2 million and above), the only tax changes causing exogenous variation in the tax rates in 2005 were the increase of the pension contribution ceiling (from HUF 5.307 million to 6.6 million), the introduction of a phase-out range for the child tax credit starting at HUF 8 million, and the introduction of a phase-out range for a number of other tax credits at HUF 6 million. The fact that tax credits were phased out as a function of total income

1 Failing to index bracket thresholds by inflation pushes taxpayers into higher tax brackets.

2 Tax credits can be fully taken advantage of up to a given income threshold, above which they are gradually withdrawn. The effective marginal tax rate increases typically by 10–20 percentage points for individuals in the phase-out range.

(i.e., taxable income plus capital income) does not seem to have a big impact on tax rates. At the same time, if these phase-out ranges are not indexed to inflation, they also affect marginal tax rates in a similar way as the bracket creep; and it is precisely this phenomenon that contributes the most to the identifying variation in tax rates. It should be noted that a more precise accounting for these phase-out regions (mostly in the income range HUF 2–3 million) made a re-estimation of the BBB results necessary.

KM analyse the effects of tax changes between 2005 and 2008 (and, as a robustness check, between 2005 and 2007). The paper does not analyse the whole income distribution, but rather focuses on high income earners, estimating the effects of the so called "extraordinary tax" of individuals, introduced in 2007. The extraordinary tax increased marginal tax rates of the top five percent of earners by four percentage points. In this income range most income-dependent phase-outs are not relevant; most of the identifying variation comes from the change of the extraordinary tax.

Results

In the following we review the main results of the BBB and KM studies, first focusing on how robust the results are to controlling for initial income and other control variables, then on the sign and magnitude of the parameter of the average net-of-tax rate (1 minus the average tax rate). The first issue is relevant primarily from a theoretical point of view, while the second has direct tax policy relevance. A negative and statistically significant effect suggests the presence of the income effect: an increase of the average tax rate would lead to a higher activity of income generation as taxpayers seek to restore their previous (net) income position. This means that the total effect of a tax reform that simultaneously decreases the average and marginal tax rates does not necessarily stimulate the generation of income. If however the sign of the parameter is positive, it may be a symptom of a labour market participation effect (some individuals may work more months in a year, or switch from part time to full time employment as a response to a cut in the average tax rate) or an improvement in tax compliance.

We present the estimated parameters of three variables: the marginal tax rate, the average tax rate and log initial income. The regression diagnostics are in all cases "perfect", therefore we will not present them in the tables (F-statistics of the first stage, under-identification and week identification tests, etc.).

Table 2.1 presents the original and the re-estimated BBB results for the whole sample of individuals earning more than the minimum wage. The tax price coefficient (i.e., the coefficient of the change in 1 *minus* the marginal tax rate) is in all specifications significant and, depending on the control variables included, between 0.0494–0.0744 (original results), and between 0.0301–0.0567 (re-estimated). This estimation range is lower than most estimates in other coun-

tries. The coefficient of initial income is very significant, and including it in the estimation decreases the tax-price elasticity by one third, while including the income effect and further control variables only affects the tax-price elasticity to a small degree. The income effect is positive (and mostly significant) in columns (2) and (3), while it becomes negative (and insignificant in the original results) in the specification treating income changes in the most flexible way – see in column (4).

Table 2.1: Results of BBB (2008) for the whole sample with income above the minimum wage (HUF 636,000)

Δlog(taxable income)	(1)		(2)		(3)		(4)	
	original	re-estimate	original	re-estimate	original	re-estimate	original	re-estimate
Δlog(1 – MTR)	0.0744**	0.0567**	0.0501**	0.0305**	0.0494**	0.0301**	0.0648**	0.0362**
	(0.0113)	(0.0111)	(0.0113)	(0.0111)	(0.0115)	(0.0113)	(0.0162)	(0.0159)
Δlog(1 – ATR)	-0.0187	-0.0761	0.145**	0.0773	0.340**	0.266**	-0.0673	-0.140**
	(0.0570)	(0.0551)	(0.0637)	(0.0612)	(0.0670)	(0.0642)	(0.0646)	(0.0613)
log(initial income)			-0.0252**	-0.0245**	-0.0311**	-0.0300**		
			(0.00248)	(0.00245)	(0.00276)	(0.00272)		
N	146,676							

Note: The regressions contain the following control variables: Column (1): only the marginal (MTR) and average (ATR) tax rates; in column (2) log initial income is added; in column (3) other individual characteristics are added; the specification reported in column (4) allows the constant and the coefficient of initial income to vary across income deciles. Standard errors are reported in parentheses.
*** Significant at the 1% level; ** 5% level * 10% level.
Source: *Bakos et al.* (2008) and own calculations on the *BBB* data.

Table 2.2 presents the results of the same specifications on a sample restricted to higher-income taxpayers (HUF 2 million and above in the original BBB analysis, while the threshold is HUF 1.95 million in the re-estimated results because this is the income level where tax credits are fully phased out).

The originally high estimated coefficient of the marginal tax rate in the BBB analysis has been revised downward substantially by the re-estimation, with the level of significance also decreasing. As presented below, still for a sample earning HUF 3–5 million the estimated elasticity is about 0.1 and statistically significant, although it would be even higher in the original BBB estimation. This is not surprising in light of the discussion of the exogenous variation in the data above: there is minimal variation in the tax rates in the income range of HUF 2–3 million. At the same time, the mortgage tax cut is phased out in the income range of HUF 3–5 million, allowing for a more precise identification (this income range was most affected by the recalculation of tax rates as compared to the original estimations).

Controlling for initial income proves to be crucial: it reduces the coefficient of the marginal tax rate substantially, while the coefficient of the average tax

rate changes its sign. The other control variables did not significantly affect the results. Based on the re-estimated results the uncompensated elasticity appears to be negative rather than positive, though the estimate of the income effect is relatively imprecise.

Table 2.2: Results of BBB (2008) for a higher income sample (HUF 1.95 million and above)

Δlog(taxable income)	(1)		(2)		(3)		(4)	
	original	re-estimate	original	re-estimate	original	re-estimate	original	re-estimate
Δlog(1 – MTR)	0.434**	0.104*	0.267**	0.0491	0.288**	0.0600	0.341**	0.0739
	(0.0567)	(0.0539)	(0.0466)	(0.0439)	(0.0499)	(0.0463)	(0.0572)	(0.0500)
Δlog(1 – ATR)	0.377**	0.214**	-0.649**	-0.803**	-0.392**	-0.586**	-0.285**	-0.520**
	(0.118)	(0.103)	(0.100)	(0.0871)	(0.113)	(0.0958)	(0.115)	(0.0941)
log(initial income)			-0.0864**	-0.0893**	-0.0801**	-0.0838**		
			(0.00620)	(0.00603)	(0.00656)	(0.00634)		
N	43,733							

Note: The regressions contain the following control variables: Column (1): only the marginal (MTR) and average (ATR) tax rates; in column (2) log initial income is added; in column (3) other individual characteristics are added; the specification reported in column (4) allows the constant and the coefficient of initial income to vary across income deciles. Standard errors are reported in parentheses.
*** Significant at the 1% level; ** 5% level * 10% level.
Source: *Bakos et al.* (2008) and own calculations on the *BBB* data.

Initial income and other control variables play a less relevant role in the KM estimation *(Table 2.3)*. The coefficient of the marginal tax rate is robustly around 0.15–0.2; the statistical significance of the average tax rate however is not robust to the specification (for details see KM).

Table 2.3: Results of KM (2011) for individuals with initial income of HUF 5–8 million

Δlog(taxable income)	(1)	(2)	(3)	(4)
Δlog(1 – MTR)	0.159**	0.155**	0.165**	0.198**
	(0.066)	(0.069)	(0.063)	(0.063)
Δlog(1 – ATR)			-0.545*	-0.557*
			(0.313)	(0.328)
log(initial income)		-0.027	-0.023	-0.009
		(0.054)	(0.050)	(0.050)
N	6900			

Note: The regressions contain the following control variables: Column (1): only the marginal (MTR) tax rate; in column (2) log initial income is added; in column (3) the average tax rate is added; the specification reported in column (4) includes further individual characteristics. Standard errors are reported in parentheses.
*** Significant at the 1% level; ** 5% level * 10% level.
Source: *Kiss and Mosberger* (2011).

How does the elasticity of taxable income depend on income?

Table 2.4 reports the elasticities estimated on the whole sample above the minimum wage (Column 1–2), and separately for two subgroups comprising the bottom 80 percent of the sample (Column 3–6). On the full sample the coefficient of the marginal tax rate is relatively low, but significant; while the coefficient of the average tax rate is negative, and is weakly statistically significant in the re-estimated results. In the sample including individuals with income between the minimum wage and the start of the phase-out range of the employee tax credit (columns 3 and 4), the effect of the marginal tax rate is virtually zero, while the coefficient of the average tax rate is positive.

Table 2.4: Estimated elasticities for various income groups, I

Δlog(taxable income)	HUF 636,000 and above		HUF 636,000–1.5 million		HUF 1.5–1.95 million	
	original	re-estimate	original	re-estimate	original	re-estimate
Δlog(1 – MTR)	0.0648**	0.0362*	0.00715	0.00828	0.128**	0.124**
	(0.0162)	(0.0159)	(0.0223)	(0.0223)	(0.0536)	(0.0531)
Δlog(1 – ATR)	–0.0673	–0.140*	0.236**	0.225**	–0.231*	–0.235**
	(0.0646)	(0.0613)	(0.103)	(0.102)	(0.119)	(0.118)
N	146,676	146,676	80,639	80,639	22,304	22,304

Note: Regressions include all individual control variables. Columns report estimations for different samples based on initial annual income. Standard errors are reported in parentheses.

*** Significant at the 1% level; ** 5% level * 10% level.

Source: *Bakos et al.* (2008) and own calculations on the *BBB* data.

A positive coefficient on the average tax rate could be a symptom of labour supply adjustment at the extensive margin (see *Chapter 3* of this *In Focus – I*) or an improvement in tax compliance. In columns 5–6, where we report estimates for taxpayers in an income range that corresponds to the phase out of the employee tax credit, we can see a significantly positive coefficient of the marginal tax rate of 0.12, and a significantly negative estimated coefficient of the average tax rate (income effect), larger in absolute value, although estimated with less precision. This result is important in the assessment of the employee tax credit: moving the phase-out region to a lower income range could have a smaller marginal disincentive effect and could even stimulate activity through the income effect. (A full-fledged welfare analysis would have to take into account the reduced leisure of those affected, which would make the welfare assessment less clear-cut).

Results for higher income levels (approximately the top 20 percent of the income distribution) are reported in *Table 2.5*. Compared to the original BBB results the re-estimation suggests a lower (and therefore usually statistically less significant) coefficient of the marginal tax rate, and a more negative (but not always statistically significant) coefficient of the average tax rate. The es-

timation in the sample above HUF 1.95 million is imprecise, but we find a significant elasticity of around 0.1 for the sample including taxpayers with an initial income of HUF 3–5 million. There is not enough variation in the tax rate changes of the full sample above HUF 3 million to precisely estimate the coefficients of the marginal and the average tax rate simultaneously. Finally, the elasticity of taxable income is estimated to be about 0.2 for individuals with an income of HUF 5–8 million in the study by KM. They also find a negative, significant, but unstable income effect.

Table 2.5: Estimated elasticities for various income groups, II

Δlog(taxable income)	HUF 1.95 and above		HUF 3–5 million		HUF 3 million and above		HUF 5 million and above		KM (5–8)
	original	re-estimate	original	re-estimate	original	re-estimate	original	re-estimate	
Δlog(1 – MTR)	0.341**	0.0739	0.741**	0.0969*	0.447**	0.446	–0.108	–0.108	0.198**
	(0.0572)	(0.0500)	(0.153)	(0.0577)	(0.0855)	(0.321)	(0.428)	(0.428)	(0.063)
Δlog(1 – ATR)	–0.285*	–0.520**	1.802*	–0.0760	0.123	–1.268**	–1.932**	–1.932**	–0.557*
	(0.115)	(0.0941)	(0.813)	(0.317)	(0.391)	(0.423)	(0.408)	(0.408)	(0.328)
N	43,733	43,733	12,753	12,753	19,080	19,080	6,327	6,327	6,900

Note: Regressions include all individual control variables. Columns report estimations for different samples based on initial annual income. Standard errors are reported in parentheses.

*** Significant at the 1% level; ** 5% level * 10% level.

Source: *Bakos et al.* (2008) and own calculations on the *BBB* data (columns 1–8); Kiss and Mosberger (2011) for column 9.

Do estimated elasticities reflect adjustment in labour supply?

In the following we review the results of three exercises aiming to reveal more about the adjustment channels behind the estimated elasticities. *Table 2.6* presents the results of the first analysis, where we split the BBB database into groups based on whether the taxpayer claimed cost deductions or not.

Table 2.6: Estimated elasticities for taxpayers with and without cost deductions

Δlog(taxable income)	HUF 636,000–1.95 million			HUF 1.95 million and above			HUF 3–5 million		
	all	no	yes	all	no	yes	all	no	yes
Δlog(1 – MTR)	0.047**	0.0495*	0.0320	0.0739	0.0256	0.151*	0.0969*	–0.00639	0.208**
	(0.018)	(0.0196)	(0.0497)	(0.0500)	(0.0679)	(0.070)	(0.0577)	(0.0844)	(0.0726)
Δlog(1 – ATR)	0.064	0.0272	0.255	–0.520**	–0.460**	–0.630**	–0.0760	0.261	–0.562
	(0.079)	(0.0821)	(0.240)	(0.0941)	(0.112)	(0.173)	(0.317)	(0.462)	(0.398)
N	102,943	91,288	11,655	43,733	30,346	13,387	12,753	8,254	4,499

Note: Regressions include all individual control variables. Columns report estimations for different samples based on initial annual income. Columns marked "no" include taxpayers with no cost deductions, columns marked "yes" in turn include taxpayers who did claim cost deductions. Columns marked "all" include both. Standard errors are reported in parentheses.

*** Significant at the 1% level; ** 5% level * 10% level.

Source: Own calculations on *BBB* data.

Cost deductions are not very frequent or significant in the Hungarian tax system, though they can be claimed against some types of income, especially contract work (wage income also has components against which cost deductions can be claimed, e.g., wage income from foreign assignments). At lower income levels (columns 1–3) the effect of differentiation is negligible, while for higher incomes we find much higher elasticity for those taxpayers who do claim cost deductions than for others (for whom the results are not significant, although the standard errors are large). This result is similar to the result found in the United States (see for example *Gruber and Saez,* 2002), but it is important to note that cost deductions are typically a fixed percent of income in the Hungarian tax system. So it is possible that the adjustment does not take place through cost deductions (i.e., through tax optimization), but rather through the magnitude (or the existence) of the given income type. Even then the question can be asked whether tax changes affect the generation or merely the reporting of these incomes. Based on these results it appears that we cannot take an obvious stand as to what extent estimated elasticities reflect the adjustment of labour supply.

Table 2.7 reports results separately for men and women as estimated by BBB and KM: although the results are not clear-cut, in most cases the elasticity is higher for women. This certainly weakens the case for tax evasion as the explanation: according to *Meghir and Phillips* (2010), tax evasion should be more widespread among men, a notion that finds support in Hungarian survey results (*Semjén et al.* 2009).

Table 2.7: Estimated elasticities for genders separately

Δlog(taxable income)	HUF 636,000–1.95 million		HUF 3–5 million		HUF 5–8 million	
	women	men	women	men	women	men
Δlog(1 – MTR)	0.0716**	0.0172	0.0892	0.117	0.232**	0.185**
	(0.0245)	(0.0276)	(0.0878)	(0.0757)	(0.103)	(0.084)
Δlog(1 – ATR)	–0.0957	0.340*	–0.176	0.0569	–1.194**	–0.246
	(0.0954)	(0.136)	(0.491)	(0.424)	(0.487)	(0.431)
N	56,979	45,964	5,550	7,203	2,144	4,219

Note: Regressions include all individual control variables. Columns report estimations for different samples based on initial annual income. Standard errors are reported in parentheses.

*** Significant at the 1% level; ** 5% level * 10% level.

Source: Own calculations on *BBB* data (columns 1–4) and *KM* (columns 5–6).

Finally, *Table 2.8* reports estimates on samples restricted to include individuals with wage income only. We suppose that individuals earning solely wage income have the least opportunity of tax optimization. The restriction does not appear to matter for the results, save for the coefficient of the average tax rate. In our interpretation this suggests that income shifting (tax optimization) is

not a dominant factor in the reaction to tax changes. This is also supported by a separate exercise reported by KM, showing no differential effect on the capital income reported by those affected by the extraordinary tax (thus finding no signs of income shifting). All in all it is likely that the elasticities estimated in both studies – which are not very large in international comparison – reflect labour supply adjustment.

Table 2.8: Estimated elasticities for individuals earning wage income only

Δlog(initial income)	HUF 636,000–1.95 million		HUF 3–5 million		HUHF 5–8 million	
	all	wage only	all	wage only	all	wage only
Δlog(1 – MTR)	0.0474**	0.072**	0.097*	0.091*	0.198**	0.212**
	(0.183)	(0.020)	(0.058)	(0.055)	(0.063)	(0.104)
Δlog(1 – ATR)	0.064	0.219*	–0.076	–0.631*	–0.557*	–0.743**
	(0.079)	(0.091)	(0.317)	(0.287)	(0.328)	(0.325)
N	102,943	73,477	12,753	6,373	6,900	4,240

Note: Regressions include all individual control variables. Columns report estimations for different samples based on initial annual income. Standard errors are reported in parentheses.

*** Significant at the 1% level; ** 5% level * 10% level.

Source: Own calculations on *BBB* data (columns 1–4) and *KM* (columns 5–6).

We may conclude that Hungarian results are overall consistent with international estimations: the elasticities are not very large, but in the case of specific groups they are notable. Re-estimation suggests lower elasticities than originally reported by BBB (2008). Estimations for high-income taxpayers show larger tax price elasticities. While the international literature rarely finds a significant income effect, in the Hungarian estimations the coefficient of the average tax rate is often statistically significant; its sign is typically negative but sometimes positive. As *Chapter 4* of this *In Focus – I* shows, this uncertainty has important consequences for economic policy. Although it cannot be ruled out that the results are partly due to tax optimization or tax avoidance, it is very likely that labour supply adjustment causes a significant part of the estimated elasticities.

The elasticity of taxable income and the "optimal income tax system"

How can we use estimates of the taxable income elasticity in the impact assessment of tax changes? The simplest type of impact assessment estimates the direct fiscal impact of a tax change: while a "static" assessment is based on the assumption that the behaviour of economic agents remains unchanged, "dynamic" fiscal effects can be predicted with the help of the elasticity. Calculations of dynamic fiscal effects were performed by *Benczúr* (2007) in an ex-ante assessment of the 2007 extraordinary tax of individuals, but also in the studies of *Bakos et al.* (2008) and *Kiss and Mosberger* (2011).

Second, the elasticity can be used as a parameter in more complex models. An example is given in *Chapter 4* of this *In Focus – I*, presenting a microsimulation model that uses this elasticity to take into account the behavioural adjustment of taxpayers.

Finally, the estimated elasticity is an important parameter of models that are used to characterize, and simulate, the "optimal income tax system".

The theory of optimal taxation

The theory of optimal income taxation is an important field in public economics. The theory views the tax system from the point of view of an ideal "social planner". Taxes change the incentives of economic agents, and distort their decisions; thus taxes are more costly for economic agents than the revenue that is collected by the government. At the same time, the government needs revenues to provide important public goods (national defence, rule of law, environmental protection) and support vulnerable groups in society. The optimal tax system is one that can raise the revenue needed to finance the public activities desirable for society with the least social cost.

The theory of optimal taxation does not provide simple answers as to what the optimal tax system looks like. One reason for this is that the optimal tax system – as is clear from the introduction above – always depends on the preferences of society. In other words, the theory can provide only conditional answers: what kind of tax system corresponds to a certain set of social goals and values.[3] Another reason is that, for the sake of transparency and tractability, theoretical analysis usually concentrates on one aspect of the tax system at a time. Thus the theory of optimal consumption taxation can be separated from the theory of optimal income or capital taxation. The aggregation of partial results and the assessment of their applicability are therefore separate important tasks of the students and practitioners of the field. Finally, the results are generally sensitive to modelling assumptions and the value of some parameters that are hard to measure, raising a further barrier to policy applications.

The foundational work of the theory of optimal income taxation is by *Mirrlees* (1971). The work of *Mirrlees* is based on two main assumptions. The first assumption is that the incentive effect of taxation is mainly effective at the intensive margin, that is, individuals may respond to taxation by increasing or decreasing their working hours (but his formulation of the theory abstracts from entry to and exit from the labour market).[4] The other main assumption is that an individual's gross wage depends on their time-invariant productivity; the government is unable to tell the productivity of individuals, it can only levy taxes based on their income.

The type of results directly following from the logical structure of the theory describe how the optimal tax rates depend on the behaviour of taxpayers, the redistributive preferences of society and the shape of the income distribution.

3 Exceptions are cases where a tax system can be changed in a way that no-one is made worse off. Such cases are however rare: even if winners gain more than the damage of the disadvantaged, it is not easy to find the way to compensate the latter.

4 The theory was later reformulated by others (*Piketty,* 1996, *Saez,* 2002) to allow for adjustment at the extensive margin, i.e., entry to and exit from the labour market.

At a given income level, the marginal tax rate should be high if taxpayer behaviour in that income range is not very sensitive to the tax rate, if redistribution is not very important for society, and if the number of taxpayers in that income range is small relative to the number of taxpayers with a higher income. This latter relationship connects the optimal income tax system to the distribution of income (or more precisely productivity). Regarding an increase of the marginal tax rate in a narrow income range, the more taxpayers there are *above* the affected income range, the more revenue is generated by the tax increase; the more taxpayers there are *in* the affected income range, the more their behavioural reaction will impair the aggregate revenue effect.

The optimal top marginal tax rate: theoretical framework

In the following we describe a result of the theory of optimal income taxation and apply it to the case of Hungary: the formula of the optimal top marginal income tax. The result was first derived by *Saez* (2001), and later applied by *Brewer et al.* (2010) and *Diamond and Saez* (2011) for the UK and the US. Our treatment, and the application to Hungary, is based on their approach following the paper by *Kiss* (2012).

The derivation, not reproduced here in full detail, is based on a theoretical framework in which individuals choose their labour supply (effort) optimally trading off consumption against leisure. The marginal tax rate affects this trade-off, directly affecting optimal effort and the income thus produced.

The optimal taxation problem is viewed from the view point of an ideal "social planner", ignoring the political process that converts society's preferences into a tax system. The goal of the social planner is to maximize social welfare; that in turn is but an aggregate of all individuals' welfare. The optimum is calculated conditional on some level of government revenue needed to finance unmodeled government activity.

The marginal weight in the social welfare function of an individual with a gross income of z is $g(z)$: this expresses how much government revenue society is willing to forgo to leave that individual with one extra monetary unit of consumption. If society values redistribution, this social marginal weight will be $g(z) > 1$ for individuals with low income (society will value an additional dollar of a low-income individual's consumption more than one dollar of government revenue); while it will be $g(z) < 1$ for individuals with high income (society will value an additional dollar of a high-income individual's consumption less than one dollar of government revenue).

A society desiring to support low-income individuals faces the problem that redistribution dampens the work incentives faced by both high-income and low-income individuals. If the tax system induces people to work less, government revenue falls and less redistribution can be financed. This trade-off between equity and efficiency is at the core of optimal income tax theory.

The optimal top marginal tax rate can be derived from the effects of a hypothetical tax change, in which the tax rate increases on income above a threshold $\bar{z}$, leaving the tax system otherwise unchanged. Such a tax change affects social welfare in three ways. 1) Government revenue increases mechanically which is a social benefit (by allowing more to be spent on things valued by society). 2) Raising the tax burden affects the welfare of those taxed which is a social cost. 3) Those affected may decrease their working hours, reducing government revenue which again is a social cost.

At the optimal top marginal tax rate τ^* the sum of these three effects must be zero. If the sum of these three effects were positive, social welfare could be increased by a further tax increase (or by a tax cut if the sum were negative), meaning that the tax rate was not optimal in the first place. This condition implicitly determines the optimal top tax rate.

The result is a simple formula for the optimal top marginal tax rate, depending on only three parameters. The first parameter is the elasticity of taxable income of the highest earners: e. The second parameter a, characterizes the shape of the income distribution at high incomes. Its definition is $a = z^m/(z^m - \bar{z})$, where z^m is the average income of individuals with income higher than $\bar{z}$. It has been observed in many countries that this ratio is fairly constant in the top range of the income distribution or, in other words, that it does not depend on the exact value of threshold $\bar{z}$. The third parameter, g is the average social marginal weight of taxpayers with an income above $\bar{z}$. The formula of the optimal top marginal tax rate is then given as:

$$\tau^* = \frac{1-g}{1-g+e \cdot a} \cdot \tag{1}$$

The tax rate thus depends on just three parameters, two of which can be empirically estimated: parameters e and a. Since the third parameter, parameter g, depends on the redistributive preferences of society, it is not straightforward to assign a value to it that is plausible for everyone. We get an upper bound for the optimal top marginal tax rate by assuming $g = 0$ above the threshold. In this case the value society assigns to an additional unit of consumption of the individuals with the highest income is negligible. The only force keeping down the tax rates of high-income taxpayers is the behavioural effect; and the optimal top marginal tax rate is equal to the tax rate maximizing government revenue. The formula of the optimal top marginal tax rate simplifies then to the formula of the revenue-maximizing top marginal tax rate:

$$\tau^* = \frac{1}{1+e \cdot a} \cdot \tag{2}$$

The optimal top marginal tax rate – application for Hungary

We have thus presented the formula of the optimal top marginal tax rate in a simple theoretical framework. To apply this formula to Hungary, we first need to assign values to the parameters. The value of parameter a can be obtained from tax return data: it is about 2.5 at high levels of income and is not sensitive to the exact choice of $\tilde{z}$ (*Kiss*, 2012). Based on the estimations of *Kiss and Mosberger* (2011) we choose a value of $e = 0.2$ for the elasticity of taxable income of high earners. Because of the statistical uncertainty about the parameter, it makes sense to also evaluate the formula at higher and lower levels of the parameters.[5]

Table 2.9 shows the value of the optimal top marginal tax rate as a function of the parameters. Of course, these values should not be compared to actual PIT rates. From a theoretical point of view social security contributions and consumption taxes are similar to the income tax, as they also reduce the amount of consumption goods that can be bought from one additional hour of work. (We describe below the actual tax rates that are comparable with the theoretical standards.)

Table 2.9: The value of the optimal top marginal tax rate as a function of parameters *g* and e, with $a = 2.5$ (percent)

	e			
g	0.1	0.2	0.3	0.4
0	80	67	57	50
0.1	78	64	55	47
0.2	76	62	52	44
0.3	74	58	48	41
0.4	71	55	44	38
0.5	67	50	40	33

Source: *Kiss* (2012).

As can be seen in *Table 2.9*, the more sensitive the reaction of taxpayers to changes in the marginal tax rate (parameter *e*), and the more socially valuable the marginal consumption of high-income earners (parameter *g*), the lower the optimal top marginal tax rate. Our best estimate of the elasticity of taxable income ($e = 0.2$) is reflected in column 2. With this elasticity parameter, the revenue-maximizing top marginal tax rate is 67 per cent. The optimal top marginal tax rate changes very little if parameter *g* increases from zero to 0.1; but it decreases to 50 per cent if the value of parameter *g* is 0.5.

If we would like to compare the theoretically optimal tax rates to actual marginal tax rates of high earners, we must calculate effective tax rates that express how much net consumption an individual can buy by increasing their

5 *Kiss and Mosberger* (2011) do not find robust evidence for the income effect. The presence of the income effect is equivalent to a case where parameter *e* has a lower value. Thus robustness checks with respect to parameter *e* allow one to get a sense of how the income effect would affect results.

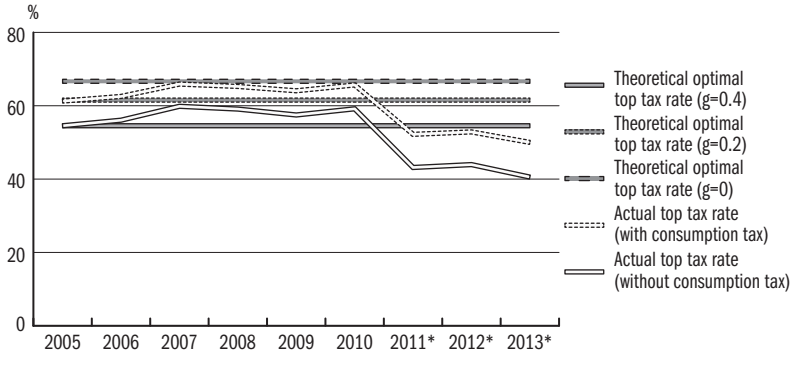
total wage cost by one unit. The formula of this effective marginal tax rate is calculated based on equation (3).

$$\tau_{top} = 1 - (1 - \tau_{cons}) \frac{1 - \tau_{\text{PIT}} - \tau_{\text{EE}}}{1 + \tau_{\text{ER}}} \cdot \qquad (3)$$

In this formula τ_{PIT} represents the actual top PIT rate, τ_{EE} and τ_{ER} represent the contribution rates payed by the employee and the employer, while τ_{cons} represents the effective consumption tax rate.[6]

Figure 2.1 shows the actual effective top marginal tax rate in Hungary for the years 2005–2013. The calculation reflects the marginal tax burden of taxpayers with income above the pension contribution ceiling. Employee-side pension contributions are not levied on income above the ceiling. The employee-side pension contribution rate is 10 per cent in 2012, while the contribution ceiling is at just below HUF 8 million; about 2 per cent of tax payers have an income above this level.

Figure 2.1: The actual top marginal tax rate in Hungary, 2005–2013



* Calculations for 2013 are based on information available in June 2012. The effective consumption tax rate for the years 2011–2013 was taken to be equal to its level in 2010, the last year for which data were available.

Source: *Kiss* (2012) based on public data on the tax rates, government budgets, and *National Accounts* for the respective years.

Based on *Figure 2.1* we can make the following statements about the actual top marginal tax rates of the last decade.[7] The effective top marginal tax rate was close to the revenue maximizing rate until 2010; starting in 2011, the actual effective rate is significantly below the revenue maximizing rate. *Figure 2.1* also suggests that if there had been no pension contribution ceiling in Hungary in these years, the actual effective rate would have been over the revenue maximizing rate until 2010 and below that rate starting from 2011.

The 2011 change in personal income taxation can be translated to the language of the model with the help of two parameters. Effective top rates up un-

6 The effective tax rate on consumption is calculated as government revenue from consumption taxes divided by household consumption. The tax rate is calculated similarly by *Brewer et al.* (2010).

7 Here we keep the discussion to make positive statements; some normative issues are raised in the subsection on the discussion of the results. For a more detailed normative analysis, see *Kiss* (2012), or *Brewer et al.* (2010), and *Diamond and Saez* (2011) from an international point of view.

til 2010 were consistent with revenue maximisation for an elasticity of taxable income of $e = 0.2$, and an average social marginal weight of $g = 0$ assigned to high-income earners. The tax system effective from 2011 is consistent, given parameter $e = 0.2$, with a significant increase of the average social marginal weight of high-income earners ($g = 0.5$; see *Table 2.9*) or, with an unchanged $g = 0$ parameter, with the notion that high earners react much more sensitively to tax changes than shown by existing estimations ($e = 0.4$; see *Table 2.9*). Estimations for Hungary presented in this chapter contradict this notion, although the long-term elasticity (in which longer-term decisions on one's career path, like the decision to study, may factor significantly) may be higher than the short-term elasticity.

Discussion of the results

The discussion is divided into two parts. First we discuss considerations that may affect the results but were ignored so far; then we briefly reflect on the normative issue of redistributive preferences. We raise five considerations that may affect the optimal top marginal tax rate. Though there is considerable uncertainty around their significance, the direction of their effect is clear in each case.

Income effect. If our estimate of the tax price elasticity is correct but we wrongly ignore the income effect, then the optimal top marginal tax rate is higher than suggested by the above calculations. The reason is that the income effect dampens the behavioural effect of tax changes or, in other words, the correct optimal top rate corresponds to the case where the taxable-income-elasticity parameter is lower. On Hungarian data the income effect is estimated by *Bakos et al.* (2008) to be statistically significant and relatively robust, while it is estimated by *Kiss and Mosberger* (2011) to be only marginally statistically significant and not very robust. The international literature rarely finds significant income effects. Thus there is considerable uncertainty around this issue.

Income shifting, tax externalities. If the elasticity of taxable income is a result of taxpayers shifting income between different tax bases (profits or dividends as opposed to wage, for example) or between different time periods, then the real fiscal effects of the behavioural adjustment to a tax change are smaller than if the effect is fully the result of reduced economic activity. In this case we overestimate the behavioural response, and consequently the optimal top marginal tax rate is higher than in our calculations above. Although this issue is not (and perhaps can never be) settled for good, indirect evidence found by *Kiss and Mosberger* (2011) suggests that the behavioural response in their policy episode is not a result of income shifting.

Tax avoidance. If there is considerable tax avoidance among some taxpayer groups, this means that taxable income is an inaccurate measure of productivity. If the extent of tax avoidance is affected by changes in tax rates, this means that real economic activity is less responsive to tax changes than our estimations

of the taxable income elasticity suggest. This, similarly to the case of tax externalities, raises the optimal top marginal tax rate (a tax increase induces a shift of income out of the personal income tax base into undeclared income sources that are taxed when they are converted into consumption, even though at a lower rate). Another effect of tax avoidance is that the tax system will burden taxpayers with a similar productivity (and similar total income) differently as a function of their ability to avoid taxes. This impairs the horizontal and vertical equity of the tax system. As the effectiveness of achievable redistribution is lower, society's desire for redistribution may suffer as a result.

Actuarial considerations. We assumed in our calculations that taxes and social security contributions have the same effect on taxpayer behaviour. This may be wrong if taxpayers expect that the benefits they receive from the social insurance system have a close link to their payments into the system. There is however great uncertainty both regarding the actual link between contributions and benefits and taxpayers' perceptions about it.

International tax competition for talent. We assumed in our analysis that the behavioural adjustment of high-income individuals occurs solely at the intensive margin. In the short to medium run it is a plausible assumption that changes in the marginal tax rates do not induce high-income individuals to exit the labour force. At the same time, any long-run relationship (whether a positive or a negative one) is hard to establish based on the experience of developed countries. One particular aspect of the extensive-margin adjustment of high earners came into the focus of recent investigations: the behaviour of certain specialized professional groups whose services are highly sought after on international labour markets (see, e.g., the studies of *Kleven et al.* 2012a, 2012b). Such groups include stars in spectator sports (like football players playing for major European clubs) or the most successful strata in other internationalized professions. A fierce international competition for high-income individuals is equivalent to a higher elasticity parameter, which implies a lower optimal top marginal tax rate.

On the redistributive preferences of society. One of the most important questions when thinking about the optimal tax system is how important redistribution is for society. Parameter *g* in the formula of the optimal top marginal tax rate expresses how much tax revenue society would be willing to forgo to allow a high-income individual to increase their consumption by one monetary unit. Since the parameter expresses value judgment, it has no scientifically correct or incorrect value. But as regarding any value-laden question affecting the whole of society, the question must be reflected on and debated. *Peter A. Diamond* and *Emmanuel Saez* – two researchers who made crucial contributions to the field – recently argued that the value of the parameter should be close to zero in the case of the top one per cent of the income distribution and, consequently, that the revenue maximizing top rate is an important benchmark for public

policy (*Diamond and Saez,* 2011).[8] The most important argument in favour of this view is that it does not rely on a very egalitarian economic philosophy. Parameter g can be approximately zero not only if the welfare of low-income individuals is more important than that of high-income individuals (as in the Rawlsian theory of justice). Such a result can be obtained even if society values the welfare of each of its members equally (that is, even on a utilitarian basis) if consumption has decreasing marginal utility.

Concluding remarks

This chapter reviewed Hungarian estimations of the elasticity of taxable income, placing these in the context of the international literature, and presenting an application of the estimated elasticity in the field of optimal taxation theory. In the first part of the chapter we surveyed the international literature in more detail than had previous Hungarian studies. Our survey concentrated on questions interesting for economic policy, rather than on technical details. We found that European studies generally found lower elasticities than the US literature, which is probably a reflection of the fact that in the US the personal income tax base can be influenced by a large number of deductions. We noted that the general view is that a good tax system leaves little opportunity to manipulate the tax base (in this case the tax base is "broad"). In such a tax system taxpayers have no strong incentives to pursue non-productive activities in order to reduce their tax base.

In the second part of this chapter we reviewed the two existing studies estimating the elasticity of taxable income in Hungary. In the process we re-estimated the results of *Bakos et al.* (2008). The results of both studies are in line with the findings of the international literature: the elasticities are not large but they are economically significant for some taxpayer groups. The re-estimation suggests lower elasticities than reported in the original BBB results. Higher-income groups generally show a higher elasticity of taxable income; the parameter of the average tax rate is sometimes positive and sometimes negative, unlike in most international studies.

Finally we illustrated the economic significance of the taxable-income elasticity by applying a result of the theory of optimal income taxation to Hungary. The theory suggests that the optimal top marginal tax rate is the function of solely three parameters: the elasticity of taxable income of high-income earners, a parameter describing the shape of the income distribution, and a parameter summarizing society's redistributive preferences (expressing how much tax revenue society would be willing to forgo in order to allow a high-income individual to increase their net income by one monetary unit). We showed that the actual top marginal tax rates until 2010 were optimal if society has a strong taste for redistribution ($g \approx 0$), while actual top marginal tax rates effective from 2011 are optimal if either social preferences for redistribution are

8 For lower values of $\bar{z}$ – thinking about the top 5 or 10 per cent of taxpayers – the assumption of $g = 0$ is less evidently plausible; this is why we present a sensitivity analysis in *Table 2.9.*

low ($g \approx 0.5$), or if the elasticity of taxable income of high earners is about twice as high as in our estimations ($e \approx 0.4$).

Such a high elasticity is not supported by empirical evidence in Hungary, and other considerations such as a potentially significant income effect point toward even higher optimal rates. A taxable income elasticity of high earners of about 0.1–0.2 is a robust result and appears to be mostly driven by the adjustment of labour supply. The long-term effect may be larger (e.g., through the adjustment of investments into human capital) but this notion is not proven empirically.

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3. LABOUR SUPPLY AT THE EXTENSIVE MARGIN

GÁBOR KÁTAY & ÁGOTA SCHARLE

The previous chapter of *In Focus – I* analyses how taxes affect the number of hours worked, among those employed. The labour supply decision can be considered at the extreme as well, when working hours are reduced to zero. In the literature this is referred to as adjustment at the extensive margin. Extensive adjustment occurs when a change in their wage or non-labour income induces the individual to enter (or start looking for) or exit employment. While the previous chapter discusses how individuals decide about their work intensity, this chapter examines the decision to enter into employment, or more precisely, the participation decision of individuals.[1]

The primary function of taxes and transfers is to generate funding for public expenditures and to redistribute earned incomes.[2] Although their impact on labour supply is unintended, it deserves special attention, as it can jeopardise the sustainability of the economy. A detailed understanding of these supply side effects is a precondition to maintaining a sustainable welfare system. The next step is to reduce the disincentives by improving the targeting of provisions (entitlement), tightening the eligibility criteria, decreasing the cost of entering employment or cutting benefit amounts.[3] In the following we do not consider welfare effects or measures to reduce supply disincentives.

The decision-making process

The decision on participation

According to the basic framework of mainstream economics, individuals compare levels of utility when deciding on their labour market participation: they either choose to work and give up leisure for wages (and consumption) or not work but have more leisure at their disposal, while giving up the wages (and consumption). Accordingly, individuals only wish to enter employment if labour (valued in itself) and their expected wages yield a higher level of utility than leisure would.

The decision clearly depends on preferences, which may vary across individuals: some may choose to work, while others may choose leisure (or unpaid domestic labour). Still, there are a number of factors affecting this simplified decision, other than individual preferences.

The first major factor is the expected net wage. It is quite evident that a person who can earn higher net wages while giving up the same amount of leisure

1 Participating workers either work or are looking for work (while being unemployed). In contrast, non-participating (inactive) individuals do not work and are not looking for work.

2 The redistribution of incomes may be justified on the basis of values (solidarity, reducing poverty) or market failures (e.g. related to credit market constraints, asymmetric information, or myopia) as well.

3 The measures listed here (except for cutting the benefit amount) can improve labour supply incentives, while leaving the original welfare purpose intact.

is more likely to want to work. On the one hand, the expected net wage depends on factors of labour demand, such as the individual's level of education, or their previous professional work experience; on the other hand, it depends on taxation of labour. Our analysis mainly focuses on the latter: how does a change in the tax burden on labour affect individuals' willingness to work? For instance, if there is a decrease in the average rate of personal income tax, the wage of the (potential) worker increases while employer costs remain unchanged, and the higher potential net wage can encourage people to give up more of their leisure in order to work.

Another similarly important factor is the accessibility and size of welfare transfers, since modern welfare states provide many benefits in order to compensate for the lost wages. The common primary aim of unemployment benefits and parental and family benefits is to compensate for the lost labour income.[4] We do not discuss this primary function of transfers here. We only analyse their financial (dis)incentive effect in the simplified framework of this chapter. This effect comes from the fact that individuals receiving a disposable income while staying out of work face a loss of these transfers as well as having to give up leisure for wages when entering employment. Therefore, when making their decision, individuals do not simply consider the net wage, but the gains to work, which equals the difference between the net wage and the transfers lost upon entering employment.[5]

Non-labour incomes may have a substantial role in the participation decision. These incomes discourage entering employment, because they increase disposable income and thus, the demand for leisure (as long as it is a normal good). For instance, if the capital income (e.g. dividends) of an individual was high enough, they would be less likely to enter employment. Certain welfare provisions (e.g. family benefits) are also income-independent, that is, their amounts do not decrease with the earned wages. Thus, these must be added to non-labour incomes. Also, the per capita incomes of other workers in the same household are to be regarded as non-labour incomes. For instance, as is often the case, one adult in the family works (the husband, typically) and the other remains inactive, but her disposable income is not zero.

The other non-financial factors that affect labour supply mostly depend on individual preferences mentioned above. There are a number of factors beyond disposable income that can influence the level of utility obtained by working or staying out of work. First, the decisions of people in the same household as the given individual may affect individual preferences: married couples often coordinate their decisions, e.g. because of the sharing of domestic labour and related preferences, or the fact that they wish to spend their leisure time together. Second, the well-being of children is also important to their parents, which alters preferences yet again. Third, working does not necessarily decrease utility; it can even yield pleasure in the form of self-realization and social contacts,

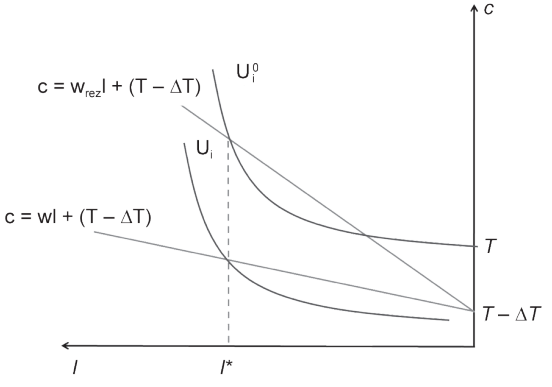
4 Besides decreasing income inequality and reducing and preventing poverty, transfers can help achieve other social outcomes, e.g. equal opportunity, the exploitation of certain positive externalities (through the means of subsidizing e.g. further education or a healthy diet), or the prevention of population decline.

5 Although their quantification is problematic and therefore, empirical studies typically omit them, the cost of claiming the various transfers and that of further related obligations should also be considered.

which alters the shape of the preference curves of the basic model. It is clear from the above that preferences can change over time: a young person still in education, a middle-aged family man, a woman with children to be raised, or an older person approaching retirement age may all have different degrees of willingness to work.

Figure 3.1 shows the dilemma of the decision.

Figure 3.1: Labour supply decision at the extensive margin



Source: *Benczúr et al.* (2012).

Figure 3.1 shows the relationship between the potential consumption of an individual (c) and their time spent working (l). If they do not work at all ($l = 0$), their disposable income is T, which is the sum of available transfers, non-labour incomes, and the share of the incomes of others in the household. As the individual begins to work, they lose some of their welfare benefits (ΔT) immediately, while their disposable income increases by the earned net wage (wl). Furthermore, it is reasonable to assume that workers do not have absolute control over how much they want to work: for instance, they may only want to work one day of the week, but such positions are available only to a very limited extent. For the sake of simplicity, let us assume that workers may only accept full-time positions. Thus, we restrict their decision to two possibilities: accept a full time position ($l = l^*$), or stay out of work ($l = 0$).

It follows from the above that the budget constraint is nonlinear even in the case of a simple flat tax system: in the case of nonzero hours worked, the equation describing the disposable income of an individual is $c = wl + (T - \Delta T)$; in the case of zero hours worked, the labour income of the person in question is $wl = 0$, and their welfare benefits and other non-labour incomes are T.

U_i denotes the indifference curve in the figure: this is the set of points which yield the same level of utility to the individual. Note the indifference curve which intercepts the budget constraint at l^* working hours: this shows the level of utility of a potential worker who decides to work. Should the person in question decide to stay out of work, curve U_i^0 which passes through point T

applies. It is clear that in this simplified, stylised framework that a potential worker decides about their participation by comparing which of the above two indifference curves yields them the higher level of utility. *Figure 3.1* shows two scenarios: in the case of wl labour-related income, the worker remains inactive because curve U_i^0 is higher than U_i, while at $w_{rez}l$, he is indifferent about entering employment, since the two indifference curves are identical in this case. A person's net wage obtained by working in this case is called the reservation wage w_{rez}, in other words, it is the lowest expected wage which makes them enter employment.

It is clear that the person in the above example would clearly prefer inactivity in case of an increase in the tax burden on labour (or consumption). Since the slope of the budget constraint decreases in this case (from w_{rez} to w), at l^* labour the new budget constraint intercepts indifference curve U_i, which is lower, therefore, consuming the gains to work yields a smaller utility surplus than leisure, which the individual has to give up upon entering employment.

In reality, the tax and transfer system is more complex of course; the budget constraint can take up many forms due to the various tax rates, credits, and benefits. For instance, if a welfare transfer is available for the working poor as well but its amount depends on the level of income, the budget constraint is broken into two segments.[6]

Thus, similarly to preferences, budget constraints and accessible transfers (or in the case of entering employment, lost transfers) can also greatly vary across individuals. Consequently, there are those who are working or looking for work (active population) and those who choose to remain inactive. It is mostly seen in the case of low-skilled, low-income individuals that the average effective tax rate at point l^* is quite high due to the transfers (gradually) lost upon entering employment, and their potential labour-related income is barely above the allowance. Clearly, in such a situation, the recipient of the benefit continues to stay out of work until they can surpass the level of utility granted by the allowance.

Despite its simplicity, the above framework illustrates the decision mechanism well, and allows us to draw a number of simple, universal conclusions at this point:

1) The higher the non-labour income of a person, *ceteris paribus* the less probable it is that they are looking for work. In this case, point T in the figure is high enough to grant the individual the suitable level of consumption and thus utility, and the consumption surplus brought about by working yields them a relatively smaller utility surplus.

2) The bigger the lost transfer (ΔT), the less the individual wants to work. The straight segment of the budget constraint starts at a lower level if ΔT is high, therefore, it intercepts an indifference curve which is lower at point l^* – that is, working yields a lower level of utility than that indicated by the indifference curve passing through point T.

6 The current social assistance scheme in Hungary works in a similar fashion for those living in the household of the claimant: the claimant themself cannot work, or else they lose the provision, and the family members can work, but if their income is too high, the family loses the provision.

3) The higher the net hourly wage of an individual (e.g. due to a higher level of educational attainment), the steeper the slope of the budget constraint, and the higher the possibility that an individual chooses to work.

The duration of job search

We borrowed the above simple model from neoclassical theory. The model tells us if a person with given preferences wants to work or not. There is either no involuntary unemployment in this simplified framework, or it is explained by exogenous frictions in the labour market.[7] In reality, those who want to work cannot get a job instantly: they are to become unemployed for a certain period of time. Labour market frictions which cause unemployment can be interpreted in the so-called search and matching models (see *Mortensen and Pissarides,* 1999, and *Morvay,* 2012). Search and matching models supplement the neoclassical model of labour supply on the extensive margin by making explicit the labour market frictions which cause unemployment.[8] The probability of finding a job is determined by the intensity of job search, the number of positions offered by firms, and the efficiency of the search. Although the possibility of modelling the participation decision is not excluded in them, most search and matching models do not consider inactivity (but assume that all who are out of work want to work), and mostly focus on explaining frictional unemployment. That is, despite their shared theoretical roots, the two literatures aim to explain different labour market phenomena.

Labour market activity, taxes, and transfers in Hungary

Manipulating labour supply is not the primary function of taxes and transfers – but their side effects on it may turn out to be substantial. In Hungary, nearly one third of the working-age population receives some sort of a benefit, while barely two thirds participate in the labour market: this suggests that analysing the relationship between the participation decision and transfers is especially justified in the case of Hungary.

The consistently low level of employment can be traced to several causes: the economic structure inherited from the socialist era, the regime change, demographic processes, and the misguided policy choices of successive governments all played a role in it.[9] Due to the generous welfare policies aimed at relieving the social tension which followed the regime change, nearly one third of the working-age population make their living from some sort of a welfare benefit – unemployment, maternity, disability, or early retirement benefits (see *Table 3.1*).[10] Their proportion quickly increased in the first few years after the regime change, and has only begun to show a slow decline in recent years. This was partly due to the tightening of the conditions for retirement, and partly to the increase in the average level of educational attainment.

7 This assumption can give an "employed versus unemployed" nature to the participation decision of the individual. Later, a number of attempts to explain involuntary unemployment appear in neoclassical theory, such as sticky wages, or the efficiency wage.

8 In a nutshell, the model analyses the optimal search strategy from the jobseekers' aspect, with job offers of varying quality coming up at random points in time, and assuming that postponing the participation decision is costly.

9 See a detailed analysis by *Köllő* (2009) on the social structure inherited from the socialist era (more specifically, the share and skill level of the unskilled population) and the role of the policy measures taken in the first years following the regime change, and an assessment of the policy decisions by *Váradi* (2012). *Fazekas and Scharle* (2012) review the processes of the period following the regime change.

10 See *Tables 11.1–11.5* in *Section 11* (Welfare benefits) in the present volume of The Hungarian Labour Market (Statistical Data) – Review and Analysis on the per capita amount of the various provisions.

Table 3.1: Share of various welfare recipients in the 15–64 year old population, 1990–2010

Year	Unemployment benefit	Social assistance	Pension (under 65 years)	Disability benefit	Maternity benefit	Total	Receives benefit and works*
1990	0.4	0.7	15.9	1.8	3.6	22.5	n. a.
1995	2.3	3.7	17.5	3.2	4.4	31.3	6.6
2000	1.8	2.4	19.7	3.5	4.4	31.8	8.3
2005	1.5	2.3	18.1	3.6	4.3	30.0	9.6
2010	2.8	2.5	15.9	2.8	4.0	28.0	10.2

* Per cent of the 15–64 year old population receiving benefits.

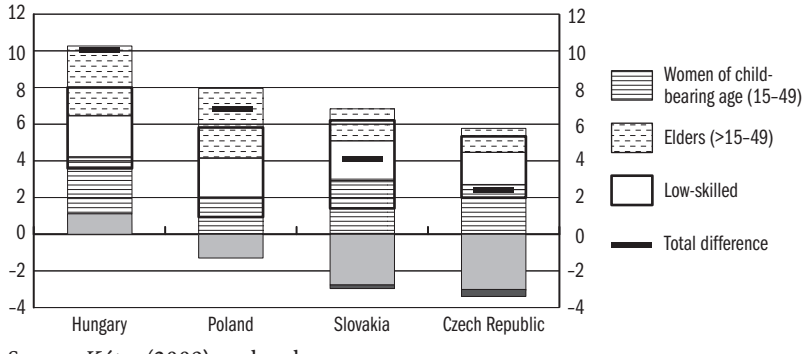
Note: The unemployment benefit covers the insurance-based provision, while the social assistance includes means tested provisions for the working aged. It includes the school leavers' allowance and provisions for the long term unemployed (depending on the year: jövedelempótló támogatás, rendszeres szociális segély, rendelkezésre állási támogatás, bérpótló juttatás). Pension includes disability pension as well, disability benefit includes recipients of other such non-pension provisions, and maternity benefits include insurance based and flat rate benefits (GYED, GYES, and GYET).

Source: Calculation by *Duman–Scharle* (2011) based on data from *Hungarian Central Statistical Office* (KSH), the *Employment Office* (FH), and the *Central Administration of National Pension Insurance* (ONYF). Last column: calculation by Árpád Földessy, based on the Labour Force Survey conducted by *KSH*.

The role of disability pensions and maternity benefits (GYES-GYED-GYET) in providing a livelihood for those who do not work is far greater than that of unemployment provisions (in every age group for women, and for those above the age of 35 for men, see *Köllő,* 2009). All things considered, the system is dominated by provisions that encourage exit from the labour market.

The majority of welfare recipients are inactive, and most of them exit from the labour market either for a prolonged period, or for good. *Figure 3.2* shows that in Hungary, the low willingness to work is mainly explained by the inactivity of "transfer dependent" groups: the difference between the average participation rate in the EU and that in Hungary is mostly due to the low-skilled, the older workers, and women of childbearing age.

Figure 3.2: The contribution of certain social groups to Hungary's participation rate deficit relative to the EU average (percentage points, in 2011)



Source: *Kátay* (2009), updated.

Empirical research on adjustment at the extensive margin

Most countries have quite complex tax and transfer systems in place; average tax rates (e.g. applicable at the average wage or the minimum wage) cannot adequately capture the variety of components of these systems. Therefore, it is not only the heterogeneity of individual preferences which justifies the use of individual (micro-level) data, but also the complexity of the tax system.

Thus, the empirical (international) literature on adjustment at the extensive margin is mainly based on micro-level analyses. Three main approaches are used. The first one includes the reduced-form approach and the program evaluation methodology. Instead of aiming for a general picture of the labour supply of individuals, studies of this approach analyse the effects of particular measures that have already run their course. Consequently, most of them only consider a small portion of the population (the affected group), so that the general effects of comprehensive changes in the tax and transfer system cannot be inferred from it. Such is the paper of *Dickert et al*. (1995) which analyses the effects of the expansion of tax credits in the United States, on data from the Survey of Income and Program Participation (SIPP). *Eissa and Liebman* (1996) wrote a similar paper using the Current Population Survey.[11]

The estimation of structural equation(s) is another well-known approach used in *Kimmel and Kniesner* (1998), *Aaberge et al*. (1999), and *Meyer and Rosenbaum* (2001), among others. Generally, results show that it is secondary earners (married women, for the most part) and the low-skilled who respond to changes in the tax and transfer system at the extensive margin. However, the empirical literature of the structural approach is incomplete in a number of ways. First, methodological differences make the comparison between estimations problematic. Thus, elasticities vary across quite a broad range. Second, also owing to the methodological simplifications, the net wage elasticities are also unquantifiable in a number of cases and therefore these estimations cannot be used for policy simulations or even welfare analyses. Third, most estimations mainly focus on the tax system and either exclude the social welfare system altogether, or include it only in a very simplified form.

The third strand of the empirical literature uses life cycle models (see e.g. the summary by *Keane,* 2011). In contrast with the above, life cycle models do not simply consider the static decisions of individuals, but their dynamic decisions – made with expected future income and situation in mind – on their activity paths, which cover their whole lifespan. The advantage of this approach is that it can treat decisions on education or retirement in their full dynamics. To its disadvantage, however, the identification of its estimation parameters is less clear. In addition, due to its complexity, the estimation procedure requires considerable processing power. Because of these reasons, most papers only consider a small portion of the population (married women, for the most

11 See *Moffitt* (2002) for a more detailed review.

part), and similarly to the second approach, do not present an overall picture on the differences between the various groups.

Detailed analysis of the adjustment at the extensive margin in Hungary

The first Hungarian studies which examine the extensive adjustment of labour supply for the total working-age population are descriptive in nature, therefore do not quantify the effects of the various factors – such as taxes and transfers – and address them only indirectly (*Galasi*, 2003; *Nagy*, 2000). The first empirical findings which include transfers as well were published by *Kátay and Nobilis* (2009): the authors used a simple decomposition method to analyse the effects of demographic composition and recipient ratios for various transfers on the aggregate participation rate. Their results suggest that the consistent increase of the participation rate beginning in 1997 was primarily due to the tightening of the access to transfers (more specifically, the gradual increase in the statutory pension age and, later, the tightening of conditions for disability pensions), and secondly due to a steady increase in the average level of educational attainment. Although smaller in magnitude, the temporary tightening of the child care system in 1996 and the change in the demographic composition (caused by the "Ratkó-grandchildren", a wave of baby boomers entering the labour market) also had a significant effect.

Benczúr et al. (2012) is considered the first Hungarian attempt at the structural approach and the simultaneous handling of taxes and transfers. Similarly to previous studies, the authors find that the response to changes in the tax and transfer system is significant only in a number of well-defined groups: the low-skilled, those approaching retirement age, and married women of childbearing age. As shown above, these are precisely the groups that can explain the difference between the participation rate in the EU and that in Hungary.

Table 3.2. shows the most important results of the estimations made by *Benczúr et al*. (2012).[12] The figures denote marginal effects and their standard errors, pertaining to a given group (i.e. computed from the average values for the given group). They show how the probability to participate changes for an individual of a given group in percentage points, if their net wage or available welfare provisions were to increase by 1%. "Whole sample" in part *A* means those aged between 15 and 74, while the full sample for part *B* contains only those aged between 25 and 54 (prime-age population). The first row clearly shows that the average worker is sensitive to changes both in net the wage (0.395) and in transfers (–0.1367).[13] However, the effect weakens considerably (to 0.127 and –0.054, respectively) for the prime age (25–54 year old) population.

The three subsequent rows show that educational attainment has a significant effect on individuals' responses to changes in the tax and transfer system. The difference between the groups of various attainment levels is even stronger if we only consider the differences among the 25–54 year old population.

12 The three-step procedure used in the paper yields a probit model, in which the left-hand side variable is a dummy for participation (employment or unemployment vs inactivity), and the right-hand side contains the net surplus income of the individual obtained through work (gains-to-work), the non-labour net income which includes welfare transfers as well, and other control variables. The first two steps serve to correct for the bias introduced by the fact that the wages of the unemployed is unknown. The estimations were run on a pooled cross section database constructed from the Household Budget Survey of KSH for the years 1998–2008. The table shows marginal effects computed on the sample averages of the respective groups.

13 This means that a 1 per cent increase in the net wage is associated with a 0.395 percentage point increase in the probability of participation, while a 1 per cent increase in welfare transfers reduces this probability by 0.136 percentage points.

Marginal elasticity is the highest for low-skilled workers, while the prime-aged with higher education are practically insensitive to changes.

Table 3.2: Conditional marginal effects for various subgroups of the working age population

	Working-age population (*A*)		Prime-age population (25–54) *(B)*	
	Net wage	Transfer	Net wage	Transfer
Whole sample	0.395	–0.136	0.127	–0.054
	(0.038)	(0.013)	(0.014)	(0.006)
Educational attainment: Primary school or less	0.294	–0.093	0.409	–0.194
	(0.089)	(0.028)	(0.040)	(0.019)
Educational attainment: Secondary school	0.310	–0.118	0.122	–0.054
	(0.031)	(0.012)	(0.012)	(0.005)
Educational attainment: Higher education	0.139	–0.045	0.050	–0.019
	(0.015)	(0.005)	(0.004)	(0.001)
Older workers (older than 50 years)	0.392	–0.103		
	(0.065)	(0.017)		
Women of childbearing age (25–49)			0.231	–0.108
			(0.021)	(0.010)
Prime-age, single men			0.096	–0.038
			(0.012)	(0.005)
Prime-age, single women			0.168	–0.076
			(0.019)	(0.008)
Prime-age, married men			0.039	–0.016
			(0.005)	(0.002)
Prime-age, married women			0.290	–0.133
			(0.025)	(0.012)

Note: Standard errors are in parentheses.
Source: *Benczúr et al*. (2012).

The last rows present the responsiveness of selected subgroups. These show that one of the most sensitive groups is that of older workers, who most likely decide about the timing of their retirement depending on the available provisions and expected wages. Moreover, the estimations confirm that married women of childbearing age are also sensitive to taxes and available transfers.

The effect of various transfers on adjustment at the extensive margin

The shortcoming of *Benczúr et al*. (2012) is that it treats the various transfer elements (such as unemployment provisions or child care benefits) as a whole, thus it does not differentiate between these elements in terms of labour supply incentives. In reality, changes in the various transfers can have varied effects. We address these issues in the present section.

Existing Hungarian studies which analyse the labour market effects of pensions and maternity benefits have not measured labour supply adjustment by participation but by the employment or entry rates of various groups. Never-

theless, in the long run, participation can be approximated by employment, if 1. wages are perfectly elastic in the long run, and 2. the state of unemployment is solely explained by temporary frictions.

The first indirect findings on the child care system in Hungary are from the cross-section estimation of *Galasi* (2003), who attempts to decompose the difference between the employment of men and women into components.[14] It is shown that 64 per cent of the observed employment gap is accountable to the parameter effects of the number of children, i.e. the fact that the negative effect of having children on the probability of entering employment was stronger for women. *Köllő* (2009) and *Szabó-Morvai* (2011) analyse the consequences of the 1996 abolition and eventual reintroduction of the insurance based maternity benefit (GYED),[15] using the Labour Force Survey of KSH and the Turning Points of Life-Course survey. Their results show an increase in the re-employment probability for skilled mothers (who were most likely entitled to GYED before the change in regulations), but this effect was not significant (except for the year of 1997). The reintroduction of GYED did not affect the probability of finding employment in the first two years after childbirth, but in the third and fourth years there was a substantial decrease (*Szabó-Morvai*, 2011).[16]

Studies examining the labour supply effects of old-age and disability pensions show a consistently substantial and negative effect. *Köllő and Nacsa* (2005) reveal the interrelationship between expected wages, disability pensions, and labour supply. They estimate the effects of various factors on the likelihood of a man aged between 44 and 62 and that of a woman aged between 44 and 58 to be retired at the end of 2000. The parameters suggest very strong regional differences. For example, the likelihood of a man 5 years short of the age for retirement was 37 per cent across the whole sample, but the same value was only 18 for the most developed micro-region and 56 for the most disadvantaged one. In the case of women, the differences were somewhat smaller. All else being equal, the low-skilled and those living in micro regions with low wages were more likely to be retired, and those in rural regions were less so. A coordinated decision between husbands and wives seems more common within families than substitution: willingness to retire is lower, not higher for those with a working spouse.

Finally, *Cseres-Gergely* (2008) estimates how present wages and expected pensions affect retirement, using individual panel data from the Household Budget Survey of KSH for the 1993–2000 period. His results indicate that a 1 per cent increase in the expected income of staying in employment is associated with a 0.11–0.13 percentage point decrease in the likelihood of retirement, while the same increase in expected pensions increases the same likelihood by 0.16–0.18 percentage points.

An earlier paper by *Cseres-Gergely* (2005) suggests that this effect is to a large extent accounted for by the tax regulations for pensions. A pensioner living in

14 Estimated in a logistic regression, on a dataset constructed from the first quarter waves of years 1993–2000 of the Labour Force Survey of KSH.

15 GYED is available to those who worked before the birth of their child, and its sum depends on their previous wages.

16 The fact that the insured maternity leave is relatively generous may be an explanation in that it provides savings for the period after its depletion (that is, it has a certain delayed income effect), but it is also possible that the decreased willingness to re-enter employment in the third and fourth years among those entitled to GYED is because they want another child (*Köllő*, 2012).

a typical family loses up to one quarter of their net income upon retirement, which is partly compensated for by the pension itself and partly by the fact that it is tax-free. The shift in individual incomes is almost exclusively determined by the previous two sources of income: other sources or casual work is rare. This shift does not influence the income of the spouse: the level and structure of their income is the same after the retirement of their spouses as it was before. Accordingly (and since other household incomes, e.g. from petty farming remain unchanged as well), per capita household income decreases by even less: 13 per cent on average.

The effect of transfers on the timing of entering employment and the probability of finding a job

Individuals who choose to work do not become employed automatically. As we mentioned before regarding the duration of the job search, the timing of entering employment and job search cannot be analysed within the traditional model of labour supply; these decisions can be interpreted within the aforementioned search and matching models instead. These models consider a number of effects – the duration of job search and the quality of matching between jobs and workers – in a unified framework. Transfers have opposing effects on these two outcomes: they increase the unemployment period but at the same time increase the quality of the match. In this subchapter we only consider the former, negative effect, see box on the latter.

Empirical estimations based on search and matching models are not directly comparable to extensive supply estimations which analyse the participation decision, because their subjects are different. However, effective policy responses can only be designed considering the results of both areas, since the current level of employment is affected by both the rate of participation (and supply) and the probability of finding a job. Therefore, we present a short review of the existing results of estimations on the probability of finding a job and the timing of accepting job offers.

Most existing Hungarian studies are based on reduced-form estimations which measure the probability of entering employment among the registered unemployed, and the timing of exits. They exploit the quasi-experimental situations created by the successive reforms starting in the 1990s, and the detailed and relatively easily accessible database of the Employment Office. In theory, estimations based on the search and matching model can capture demand constraints (such as the quantity of vacancies) and the effectiveness of the search as well as the factors which affect supply (the intensity of the job search). However, the estimations in Hungarian studies compare the behaviour of groups of the same productivity (which expect wage and job offers of the same distribution) who only differ in terms of the amount or duration of the unemployment benefit they are entitled to.

The positive effect of transfers on the labour market

Unemployment benefits may keep the reservation wage higher than optimal, and thus can increase the period of unemployment, but at the same time they help job seekers find the position most suited to their abilities, thus making the worker–employer match more effective. Besides solidarity, this is the strongest argument for mandatory state unemployment insurance. This is because such an insurance would not work on a market basis, while it is the only way to ensure that workers who lack the savings to support a family and themselves can still search for a new job with the appropriate care. Benefit payments also make sense even if the problem could be tackled by taking out a loan, because many people cannot realistically assess their future opportunities or are unable to secure an adequate loan due to a dysfunction in the capital markets.

Chetty and Looney (2006) estimated that in both the United States and Indonesia, food consumption is reduced by 10 per cent if the main earner becomes unemployed. This shows that households can compensate for the most part of the income loss resulting from unemployment: this finding suggests that the welfare gain resulting from the implementation of a formal unemployment insurance system should be low. However, in the case of Indonesia, it should also be taken into account that people use inefficient methods to avoid their consumption declining with their income (in technical terms: they smooth their consumption). Generally, if consumption does not closely follow the changes in income because people are highly risk averse, then public insurance would provide significant welfare gains by eliminating inefficient adaptation strategies, such as reducing human capital investments (*Chetty and Looney* 2005).

So far there is only one Hungarian study on the positive effect of unemployment insurance: *Galasi* (1996) analyses the effect of the amount of the unemployment benefit on the intensity of job search, using data for 1992–1995 of the household panel of TÁRKI. His estimates reveal that a larger benefit amount is associated with greater intensity in searching for a job, in the case of men. Thus, a larger benefit improves the chances of finding a job, since more intensive job search is likely to increase the frequency of job offers.

In the past twenty years, five papers have been published on the insurance-based unemployment benefit and four on the allowance for the long-term unemployed, and neither of them revealed a substantial negative effect on labour supply. For instance, in a study of those who exhausted their entitlement to the unemployment benefit, *Micklewright and Nagy* (1998) find a sudden increase in the re-employment rate of claimants immediately after they exhausted the benefit – suggesting that some of them found a job earlier, but delayed the entry –, but the affected group is only 2–3 per cent of the cohort under analysis. *Wolff* (2001), the most prudent of the three studies dealing with the reform of 1993, finds no effect of a combined decrease in the replacement rate (the benefit divided by the previous wage) and in the benefit duration in the case of men, and only a minor positive effect in the case of women.[17] *Köllő* (2001) estimated the effects of the benefit amount using data from the Unemployment Register of the Employment Office and survey data gathered in the spring of 2001.[18] According to his results, the replacement rate does not affect re-employment, but there is a slight increase in the probability of entry at the end of the entitlement period. However, the effect is only substantial for a minor fraction of the unemployed (those with a high school degree or higher). *Micklewright and Nagy*

17 This result somewhat refined the previous estimation by *Micklewright and Nagy* (1998) in which they did not control for the effect of recalled workers. This is due to the fact that the effect of the tightening was measured by a comparison to the employment probabilities of two groups of benefit recipients: those who became unemployed just before and immediately after the reform. This introduced a bias because the share of workers recalled to their previous job (for seasonal work) was higher among new entrants, and these recalled workers have a higher chance of entering employment. See a more detailed review of the analyses on the effect of this and similar reforms in *Wolff* (2001) and *Cseres-Gergely* and *Scharle* (2012).

18 Also controlling for the effect of the higher re-entry rate of recalled workers.

(1998), pertaining to the spring of 1994, estimated the largest disincentive effect out of the four papers which analyse the benefit for the long-term unemployed: they find that entitlement to the benefit is associated with a 0.144 decrease in the probability of entering employment in the case of men (0.157 in the case of women). Further estimations show smaller effects, but the differences are minor, and can be explained by changes in either the willingness to work (a shift in preferences) or in the entitlement conditions for the benefit, or by small differences in the estimation procedures.

Conclusion

The primary function of taxes and transfers is to provide funding for public expenditure, redistribute earned incomes on value-based terms, and compensate for labour income loss. Although their effect on labour supply is unintended, it deserves special attention, since it can jeopardise the sustainability of the economy. A detailed understanding of these supply side effects is a precondition to maintaining a sustainable welfare system.

This chapter explored how the tax and transfer system affects the participation decision of individuals, and how it enhances or reduces the intensity of job search and the entry into employment.

Hungarian empirical studies reveal that the labour supply effect of the tax and transfer system can be significant among certain groups: *Benczúr et al*. (2012) find that mainly the low-skilled, the older workers, and married women are sensitive to taxes as well as transfers, as opposed to prime-age workers with higher education who are practically insensitive to such changes. Due to the all-inclusive nature of the estimation method, this result cannot ascertain whether the entitlement (access) to the various transfers or the amount of the transfer (compared to expected wages) has the stronger effect on participation. Thus, it remains unclear whether a tightening of entitlement conditions or a reduction in the benefit amount is better suited for increasing participation.

Estimations on the various transfers seem to confirm the former: there was no substantial increase in the re-entry rate of mothers resulting from the abolition of the insured maternity leave in 1996 (which meant a reduction in the amount, since everyone remained entitled to the flat rate leave), while studies on old-age retirement and the increase in retirement age (which tightened access) found a significant labour supply effect.

Results on the timing of entering employment and the probability of finding a job add further support: the papers which analyse the timing of entering employment following a cut in unemployment provisions find no significant positive effect on labour supply.

Finally, though it is not discussed in this volume, we must note that the primary function of transfers is not the creation of incentives for labour supply, but the redistribution of incomes. Therefore, reducing their disincentive

effects requires measures which are not in contrast with this primary function (that is as long as decision makers do not want to alter the scope of redistribution as well). Such measures may include the tightening of the access or of behaviouralconditions, or a more consistent enforcement of existing job search conditions.

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4. MICROSIMULATION AS A TOOL FOR ASSESSING THE IMPACT OF TAX CHANGES

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Microsimulation makes it possible to take into account differences across households in the impact assessment of government measures. Heterogeneity may be important for two reasons. First, measures may affect different households differently (e.g., high and low-income households, families with and without children, etc.). Second, different households may respond differently to the same policy measure. Microsimulation modelling makes it possible to quantify the effect of heterogeneity. Using the results of the previous two chapters on labour supply, this chapter analyses how changes in the tax and transfer system affect labour supply and macroeconomic performance.

Microsimulation as a tool

What is microsimulation?

Microsimulation is a modelling tool that can be applied in the analysis of the effects of economic policy measures at the level of economic units (individuals, firms, households).[1] The modelling is based on a database providing detailed information on a sample of economic units such as the age, gender, and earnings of an employee; or the number of employees and annual revenue of a firm, etc. The first step in the impact assessment of an actual or hypothetical government measure is to calculate how the changes affect the individual economic units. For example, in the analysis of personal income taxation, microsimulation modelling begins with calculating the tax liability for each taxpayer before and after the changes. The total tax revenue is then calculated by aggregating the tax payable by individuals, weighted by population weights. Given that the unit of analysis is the individual, the simulation can take into account the interactions between various elements of the tax system, for example how a taxpayer's child tax credit is affected by changes in the rules of another tax credit. Such exercises cannot be conducted – or only less accurately – without microsimulation. This is why microsimulation is important in the *ex ante* impact assessment of government measures.

The use of microsimulation models has become increasingly widespread in policy making and policy analysis in the last two decades. They allow policy analysts to assess the redistributive impact of planned reforms, i.e., the analysis of which social groups win and which ones lose as a result of a policy change.

1 This paper only discusses models used for the analysis of tax and transfer systems, although microsimulation modelling is also used in other areas.

Microsimulation models allow one to study the effects of complex reforms (for example the overhaul of the whole family support system) as well as changes affecting only one element of the system [such as a targeted increase in the child tax credit or the introduction of a 0% tax rate as a substitute to the employee tax credit (ETC)].

The two key elements of a microsimulation model are thus a database representing the population and a set of rules decsribing the tax and benefit system. These two determine the accuracy of the model. The database can be of two types: it may be a survey or an administrative database. The Household Budget and Living Conditions Survey (in Hungarian: *Háztartási költségvetési és életkörülmény-adatfelvétel, HKÉF*) of the Hungarian Central Statistical Office (in Hungarian: *Központi Statisztikai Hivatal, KSH*) is an example for the first, while the representative sample of individual tax returns from the National Tax and Customs Administration (in Hungarian: *Nemzeti Adó- és Vámhivatal, NAV*) is an example for the second. Both types of data have advantages and disadvantages. Surveys typically have a smaller sample size which makes estimation errors larger; also, sample selection and misreporting may cause systematic measurement errors. On the other hand, the advantage of surveys is that they provide information about the household, as opposed to just the individual. Administrative databases in turn are larger but they often provide information only about the individual and no information on other members of the household (at least this is the case in Hungary). Furthermore, administrative data sources only have information that is strictly related to the purpose of the public data collection at hand. It is possible, although far from sure due to the nature of the issue, that survey data include information on undeclared income and work. As a consequence, the decision which type of data to use should be made in the light of the research question. If the focus is on changes in taxation then the administrative database is usually the better choice. However, if the analysis focuses on taxation and transfers simultaneously, then information about the family is probably necessary, therefore the appropriate data source will be a survey such as the HKÉF.

Microsimulation models can be divided into static and dynamic models. The former are based on the simplifying assumption that economic actors do not change their behaviour in response to reforms, while the latter takes such behavioural reactions into account.[2] Although in reality economic agents may change their behaviour in response to measures, static models can still be useful. Firstly, they are sometimes the only tool we have in the absence of reliable empirical estimates for the behavioural response. Secondly, even if there are empirical estimates of the parameters describing behavioural responses, it is not always easy to assess the estimation error and its impact on the simulation results. The assumptions underlying static simulation are simpler, and its weaknesses more transparent, which can be an advantage when interpreting the results.

2 This type of dynamic microsimulation is also often referred to as *behavioural* microsimulation. Some of the literature uses the term *dynamic* microsimulation in a more specific sense: it is used to describe long-term models, typically used for the long-term analysis of social security systems, that take into account the aging of generations.

The development of microsimulation modelling

One of the first microsimulation models (TAXSIM) was developed by the National Bureau of Economic Research (NBER) in the USA at the end of the 1970s (*Feenberg and Coutts*, 1993). Currently, most developed countries use microsimulation models both in public administration and in research institutes[3] particularly for the impact assessment of policy proposals. In the United Kingdom, for example, various microsimulation models are used: PenSim2 is used for the analysis of the pension system (*Emmerson et al.* 2004), the Policy Simulation Model is used for the analysis of proposed changes in the tax and benefit system, and a number of universities and research centres, such as the Institute for Fiscal Studies (IFS), have their own models. The Netherlands Bureau for Economic Policy Analysis (Centraal Planbureau, CPB), which plays the role of a fiscal council, has a multi-purpose microsimulation model, MIMOSI (*Romijn et al.* 2008). Microsimulation has been used in the US to analyse the potential impact of different health care reform proposals on the proportion of the uninsured (*Gruber,* 2005, 2008, and *Gruber and Levitt*, 2000), the employment incentives of family taxation in Germany (*Steiner and Wrohlich,* 2004), and different scenarios of pension reform in Belgium (*Desmet et al.* 2007). Most of these models take into account behavioural effects. Finally, the EUROMOD model should be mentioned: a model that covers EU Member States and makes it possible to carry out static microsimulation and comparative analysis of countries. There is also an extension for a limited group of Member States for dynamic analysis.

Microsimulation modelling has developed in two important directions in recent years (see for example *Bourguignon and Spadaro,* 2005, and the overview by *Williamson et al.,* 2009). On the one hand behavioural effects, particularly labour market behaviour is increasingly incorporated into the simulation (see for example *Aaberge et al.,* 2000, *Blundell et al.,* 2000, *Creedy and Duncan,* 2002, and *Immervoll et al.,* 2007), in parallel with the increasing emphasis on economic incentives in economic policy. While these models have mostly concentrated on the adjustment of labour supply at the intensive margin, i.e., adjustment of working hours, more recent research tries to take into account the extensive margin as well, i.e., entry to and exit from the labour market.

Another important development in recent years has been the integration of micro- and macro approaches in economic policy modelling by the combination of microsimulation and "computable general equilibrium" (CGE) models. By linking microsimulation to macro models it is possible to take into account indirect macroeconomic feedback effects and thus quantify the overall economic effects of policy changes. The microsimulation module ensures that the analysis also takes into account household heterogeneity. Therefore, as opposed to traditional macro models, the analysis is not based on the assumption

3 Some models, mainly used in Anglo-saxon countries are available at microsimulation.org.

of one, or a few, representative households. Although commonly this approach was applied to developing economies, various studies used it in the analysis of taxation in developed countries, such as *Aaberge et al.* (2004) to explore the effect of ageing on the sustainability of public finances in Norway; *Arntz et al.* (2008) to analyse the hypothetical reform of the German welfare system; and *Fuest et al.* (2008) and *Peichl* (2009) to analyse the hypothetical introduction of a flat income tax in Germany. *Davies* (2009) provides a survey of the linked microsimulation-CGE approach, while the topic is also picked up by the special issue of an international journal focusing on microsimulation (*Bourguignon et al.* 2010).

Microsimulation analyses in Hungary

The history of microsimulation in Hungary dates back to around 15 years ago; the method has however gained ground in recent years. The first tax and benefit microsimulation model was developed by the research institute Tárki for the Ministry of Finance in 1997 (*Szivós et al.* 1998). Later, Tárki and the Ministry of Finance cooperated to develop the microsimulation model "TÁRSZIM" in the first half of the 2000s. This model is based on a database that links data from tax returns to the HKÉF. This model was used by *Benedek and Lelkes* (2005) to analyse the effect of the introduction of a hypothetical flat tax in Hungary. The Ministry of Finance also developed its own model, HKFSZIM (*Benedek et al.* 2009), based solely on the HKÉF. At the same time, Ecostat also created microsimulation models to analyse the Hungarian tax and benefit system (*Ecostat,* 2009, *Cserháti et al.,* 2007, 2009). The "HKFSZIM" model was developed further by the Office of the Fiscal Council by incorporating the adjustment of labour supply at the intensive margin, and by an attempt to link microsimulation to the macro model of the Fiscal Council (the two models were linked by manual iteration). The extended HKFSZIM model was used by the Fiscal Council to analyse the effect of proposals regarding the tax system (*Fiscal Council,* 2010, *Benedek and Kiss,* 2011) and for own research projects. One of these projects, by *Gáspár and Varga* (2011), analysed the incidence of non-performing mortgage loans during the economic crises, assessing the relative importance of contributing factors such as job losses and the depreciation of the currency. The analysis conducted simulations to estimate the ratio of non-performing loans under different economic scenarios.

Four other Hungarian studies used microsimulation to analyse the effect of tax changes, however these did not develop a full-fledged model. One of these is the study by *Bakos, Benczúr and Benedek* (2008) that estimated the elasticity of taxable income and simulated, using the elasticity, the effects of the introduction of a flat income tax. *Kiss and Mosberger* (2011) used a simulation of a tax increase on high earners to illustrate the economic significance of their

estimated taxable-income elasticity. More complex microsimulation calculations were presented by *Benedek and Kiss* (2011) using partly static, partly dynamic microsimulation methods. Finally, *Benedek and Lelkes* (2011) used a microsimulation approach to estimate the impact of tax evasion on income redistribution (see *Chapter 6* of *In Focus – I*).

A microsimulation tool

The rest of this chapter uses a microsimulation model created by Péter Benczúr, Gábor Kátay and Áron Kiss in Magyar Nemzeti Bank (MNB, the central bank of Hungary) to analyse hypothetical and actual economic policy measures (for a detailed description of the model see *Benczúr et al.* 2012a; the first results of the model were published in a non-technical paper in the MNB Bulletin, *Benczúr et al.* 2011).

The model has two important differences compared to microsimulation models used previously in Hungary. First, it takes into account labour supply adjustment both at the intensive and extensive margin; second, the microsimulation module is embedded in a small macro model, which means that long-term, general-equilibrium effects of government measures can be analysed. Two elements of the modelling strategy can be viewed as contributions to the international literature: 1) the way adjustment on the extensive margin is taken into account, 2) the full integration of the macro model and microsimulation that is made possible by the simplicity of the macro model.

Before moving on to the analysis, the main characteristics of the model are described. The model is based on the 2008 wave of the HKÉF. The use of the household survey is necessary because the model aims to analyse the effects of the whole tax and benefit system. Although it would be possible to use a more recent wave (the 2009 and 2010 waves are available at the time of the writing of this chapter), these are snapshots of an economy in recession. Considering that the dynamic effects calculated by the model are long-term, representing a hypothetical transition "from equilibrium to equilibrium", data from the last year prior to the crisis appeared to be a better choice.

The income distribution observed in HKÉF data – particularly at high income levels – does not correspond to that observed in administrative data; therefore an income correction step has been carried out before the simulation. Income reported by taxpayers in the HKÉF was multiplied by a percentile-specific correction factor at high income levels.

The model explicitly simulates labour supply adjustment at both the intensive and extensive margin. Labour supply adjustment on the intensive margin is identified with the elasticity of taxable income, as estimated by *Bakos et al.* (2008) and *Kiss and Mosberger* (2011) (see *Chapter 2* of *In Focus – I*). We calculate the marginal and average tax rates for each tax payer before and after the tax changes; the adjustment at the intensive margin occurs by allowing

the taxpayers to increase or decrease their reported income to the extent corresponding to the estimated elasticities.

Identifying the labour supply adjustment at the intensive margin with the elasticity of taxable income is a natural choice from the perspective of a fiscal analysis, but may be questioned from a macroeconomic perspective. It is an error to equate these two concepts if the taxable income elasticity is not caused by any real economic adjustment (changes in the number of hours worked or work intensity) but rather simply by tax optimisation such as "relabeling" of income. There are two reasons why we assume that the elasticity parameters largely represent real labour supply adjustment. First, the estimated parameters are considerably lower in Hungary than in other countries where the taxable income can be significantly reduced by applying deductions (such as the United States), and it does not differ significantly from estimates of the taxable-income elasticity on broader definitions of income in the US that are harder to manipulate by the taxpayer. Our estimated parameters are also consistent with earlier international studies that estimated the elasticity of labour supply (number of hours worked) directly (see for example *Meghir and Phillips,* 2010). Second, as discussed in *Chapter 2* of *In Focus – I*, the taxable income elasticity of individuals with wage income only is not lower than that of other groups in our estimations, whereas these individuals are probably the least likely to engage in tax optimisation practices.

The modelling of adjustment at the extensive margin is based on estimates by *Benczúr et al.* (2012b). The approach and the results are presented in detail in *Chapter 3* of *In Focus – I*, therefore only a brief overview is provided here. Apart from individual characteristics, willingness to work is influenced by the amount of income an individual can expect to receive when working or out of a job. The difference between these two is the *"gains-to-work"*: this is lower than the wage income for those who lose eligibility for certain benefits when they take up work [an example is the child care benefit (*"gyed"*)]. For those who are in employment the simulation determines, based on the relevant rules, what transfers they would be eligible for if they were not working. For those who are out of work the wage they would be offered on the market is estimated. Then the model computes the gains-to-work for each individual and it calculates, based on the relationship estimated by *Benczúr et al.* (2012b), the probability of being active, given each individual's age, gender and other characteristics. The microsimulation model thus calculates the labour supply shock resulting from a change of the tax and transfer system as a sum of two components: adjustment at the intensive and the extensive margin.

The labour supply shock thus calculated serves as an input into a small macroeconomic model that calculates how changes in labour supply affect real wages, the capital stock and output in the economy. The macro model is a long-run, neoclassical model of a small, open economy. In the long run capital is nearly

perfectly mobile internationally, or put differently, differences in the (risk-adjusted) returns between countries are nearly completely equalised. Therefore the supply of capital is highly elastic in the model. In addition to the capital supply equation, another element of the macroeconomic model – based partly on micro-based estimates and partly on calibration – is a production function of the economy. In equilibrium, wages are equal to the marginal product of labour, as derived from the production function. The production function also influences the long-term substitutability of capital and labour.

Long-run equilibrium wages, as determined in the macro model, influence the long-term supply of labour: thus the behavioural microsimulation is repeated based on the output of the macro model; then, using the resulting labour supply shock, the macro model is re-run. This iterative process is continued until equilibrium is reached, that is, until the wage development on which the microsimulation is based corresponds to the macroeconomic consequences of the labour supply shock that is the result of the microsimulation.

The microsimulation model can, with relatively few components, assess the long-run labour supply and fiscal implications of changes in taxes and transfers. The main components are the labour supply elasticities (themselves based on empirical estimates) and the small macroeconomic model assuming a very elastic adjustment of capital supply. However, there are a number of important considerations that the model does not take into account. These should be kept in mind when interpreting the results. The most important limitations are the following:

1) The macroeconomic model is suitable for comparative statics exercises; the dynamics of the transition path to the new equilibrium cannot be analysed.

2) Also following from the static character of the macro model, it does not explicitly model the consumption-savings decision of households (and the level of consumption does not feed back into other relationships of the model). Consumption (and VAT revenue) is thus calculated by the model based on a simplifying assumption that households spend their total disposable income. On the short run this means that we overestimate consumption and VAT revenue; in the long run, however, it may be a more acceptable approximation.

3) The model is not closed from the side of the state; thus budget deficit (and debt) does not affect the sustainability of government finances via interest rates. This is less of a problem for a static macro model than it would be for a dynamic model; nevertheless, when interpreting the results it must be kept in mind that the model does not take into account the implications for fiscal sustainability of various sets of measures.

4) Calculations of the employment effects are based on the assumption that group-specific unemployment rates observed in 2008 represent equilibrium unemployment levels; the micro-mechanisms of search-and-matching in the job market are not, however, modelled in detail. This may be a relevant ommis-

sion if some labour market reforms affect the mechanisms of job search-and-matching. For instance, if the duration of unemployment assistance is too short, job seekers might be less likely to find suitable job opportunities. A less effective labour-market matching has a negative effect on economic efficiency. The model does not take these considerations into account; it focuses exclusively on the incentive effect of transfers, that is, that transfer cuts induce individuals to search more intensively for a job. This means that the model may overestimate the positive long-term effect of transfer cuts on employment.

5) The model treats different types of labour (skilled and unskilled, for instance) as "perfect substitutes". This means that the model assumes that all job seekers will eventually find employment at the equilibrium wage rate (subject to a group-specific equilibrium unemployment level). It also follows that relative labour costs are assumed to correspond to relative productivity levels. The model ignores the possibility of a structural mismatch between labour supply and demand in terms of education, experience, or regional distribution. Although this assumption makes sense in the very long run, it may result in overestimating the employment effect of transfer cuts because it is uncertain that individuals – even if they want to find a job – have the same likelihood of finding employment as seemingly similar workers already employed.

6) Point 4 and 5 highlighted factors that might lead to the model overestimating the long-run employment effects of transfer cuts. It should be added that the long-run approach of the model hides the fact that transfer cuts reduce aggregate demand and therefore slow down growth in the short run (particularly in a weak cyclical position). We also note that transfer cuts increase the inequality of income distribution; this effect can be evaluated by the model (for detailed calculations see *Benczúr et al.* 2011, 2012a).

7) The model is based on the assumption that real wages are perfectly flexible over the long term. This assumption guarantees that all labour supply shocks increase employment. If wages cannot adjust for some reason, the excess labour supply leads to an increase in unemployment rather than the expansion of employment. The assumption of perfectly flexible wages means that the effects of a minimum wage policy cannot be evaluated in the model. The minimum wage puts a legal limit on downward wage adjustment, reducing the employability of low-productivity workers (its effect can however be eroded in the long run if it is increased at a slower pace than the rate of general wage inflation).

8) Our framework does not explicitly model the behaviour of the self-employed and the informal sector (for more on the informal sector see *Chapter 6* of *In Focus – I*). The labour supply elasticities that are used in the model (particularly in the case of adjustment at the intensive margin) are mainly related to employees (rather than entrepreneurs). This means that in the simulations we make the implicit assumption of unchanged behaviour on the part of the self-employed. With regard to the informal sector, the main issue is that it

is unclear whether undeclared work is at least partly observed in the survey data of the HKÉF. If only legal employment is observed in our data, than our simulation results are valid for declared employment, while the fiscal effects are estimated without distortions. If, however, respondents in the HKÉF also report undeclared work, then the results concerning employment will reflect both declared and undeclared work, while our estimated fiscal effects will be less accurate. The simulated employment effects may be accurate even in this case because the estimation of adjustment on the extensive margins is based on the HKÉF data (see *Benczúr et al.* 2012b); that is, the estimation and the simulation relate to the same indicator of employment, itself probably close to the official employment statistic calculated based onKSH's Labour Force Survey.

Analysis of changes in the tax and transfer system

This section aims to answer three questions with the help of the microsimulation model. 1) First, a flat-rate income tax system is compared to three alternative tax systems in which groups of low-income earners face lower tax rates. 2) Second, revenue-neutral reform packages are compared to see which one is more friendly to economic growth and employment. 3) Finally, the long-term effects of actual measures introduced since 2010 are simulated.

There is some overlap between the analyses presented here and our previous analyses published in the *MNB Bulletin* (*Benczúr et al.* 2011); however, the analysis has been updated to reflect policy measures adopted or proposed since the publication of that article. While both this paper and the *MNB Bulletin* article focus on specific actual reform packages, *Benczúr et al.* (2012a) aims to provide a detailed, and more technical, description of the model rather than a detailed analysis of hypothetical or actual reform packages. Only the simulations of revenue-neutral scenarios (i.e., point 2) above) and the results reported in *Table 4.4* are taken from that paper, without substantial changes.

The employee tax credit and its alternatives

Table 4.1 displays the results of three scenarios. In all three the benchmark is a hypothetical, pure, flat income tax system (with a tax rate of 16%) without any employee tax credit or child tax credit, in which taxable social transfers and benefits are taxed as "independent" income (non-wage income). All other aspects of the tax system are based on rules that were in force in 2010. This benchmark is chosen for three reasons. First, apart from the child tax credit, it is close to the ideal tax system as envisaged by the current Hungarian government. Second, the simplicity of the benchmark makes it very easy to analyse the partial effects of single policy measures without the interference of confounding elements. Finally, since the social transfers are taxed as independent income, as opposed to wage income, the employee tax credit does not decrease

the tax payable after them. Therefore, the employee tax credit only reduces the taxes payable after wages. As will be shown this is an important difference compared to the tax credit system that had been in force until 2011.

The first pair of columns present the effects of a simple employee tax credit as compared to the benchmark tax system. The employee tax credit makes wage income tax exempt up to the minimum wage – a monthly income of HUF 73,500 (approximately EUR 270) in 2010. With a tax rate of 16% the maximum amount of the employee tax credit becomes HUF 11,760. The employee tax credit is phased out at a rate of 10% starting right at the minimum wage. The static fiscal effect of the employee tax credit thus specified – considerably less generous than the actual tax credit between 2003 and 2011 – is approximately HUF 180 billion, roughly equivalent to the cost of job protection measures being introduced in 2013 (see below). While its employment effect is considerable – two per cent – it increases effective labour and GDP to a lesser extent suggesting that those newly entering employment are mainly low-skilled, low-productivity workers. The large employment effect is mainly due to the fact that the tax credit can only be used on wages, thus the financial gains to employment increases substantially for low earners, which creates incentives to take up employment.

The scenario in the second pair of columns achieves the tax exemption of incomes up to the minimum wage through the introduction of a zero-per-cent lower tax rate. The difference between the zero-rate version and the tax credit is that all tax-payers (even the high earners) benefit from the zero rate since it is not phased out. This also means that this scenario is considerably more expensive for the government budget than the employee tax credit. To correct this, the upper tax rate must be set in a way that the cost of this reform package is roughly equal to the first scenario: in this case, the marginal tax rate on income above the minimum wage is 24 per cent instead of 16 per cent.

Table 4.1 shows that the zero-rate version performs worse in every aspect than the tax credit: in addition to a significantly lower employment effect, it has a negative impact on effective labour, capital and GDP. The reason for this is that the higher, 24% marginal tax rate has a negative impact on higher earners' labour supply at the intensive margin.

The third pair of columns show the estimated impact of the targeted employer-contribution relief included in the government's "Job Protection Program" as effective in 2013. As part of these measures, workers aged under 25 or over 55 or those in manual occupations ("category 9" of the Hungarian occupation classification system FEOR, based on the international system ISCO) are eligible for a 14.5 percentage point employer-contribution relief after wages up to HUF 100,000 for two years; women returning to work after receiving child care benefits are entitled to a 27 percentage point employer-contribution relief on wages up to HUF 100,000 forints for two years (and a relief of 14.5 percentage points

for an additional year). As argued in *Chapter 3* of *In Focus – I*, the contribution relief actually targets groups with a low employment rate whose labour supply probably responds sensitively to incentives at the extensive margin. The previous two scenarios have been calibrated to have a similar static fiscal impact to the "Job Protection" measures. The results indicate that although employer contribution relief has a considerable impact on employment, it is still lower than the effect of the employee tax credit presented in the first two columns. At the same time, its dynamic effect on the government budget balance is more favourable.

Table 4.1: Tax credit and its alternatives

	Employee tax credit[a,b]		Zero lower rate with a higher regular rate[a]		"Job Protection" measures[a,c]	
	static	dynamic	static	dynamic	static	dynamic
Macroeconomic effects (difference from the benchmark in per-cent, levels)						
Effective labour		0.9		–0.6		0.6
Employment		2.0		1.3		1.0
Capital stock		0.7		–0.5		0.5
GDP		0.8		–0.6		0.6
Gross average wage		–0.1		0.1		1.6
Disposable income		2.4		1.5		1.4
Fiscal effects (HUF billion, 2010 prices)						
Personal income tax	–185	–185	–177	–199	0	30
Employee contributions	0	9	0	–8	0	35
Employer contributions	0	19	0	–16	–185	–142
Taxes on consumption	35	44	32	27	0	26
Taxes on corporations	0	5	0	–4	0	4
Taxes on sales	0	4	0	–3	0	3
Transfers	1	25	1	8	0	9
Change of budget balance	–150	–79	–144	–194	–185	–37

[a] Compared to a flat tax of 16% without any type of tax credits.
[b] Social transfers are not eligible for the employee tax credit.
[c] The following groups are eligible for an employer-contribution relief. Workers aged under 25 or over 55 and those in occupations of "category 9" in the Hungarian occupation classification system (FEOR, based on the international system ISCO): 14.5 percentage points after a gross monthly wage of up to HUF 100,000 for two years; women returning to work after receiving child care benefits: 27 percentage points after a gross monthly wage of up to HUF 100,000.
Note: Positive changes of budget balance indicate an improvement and negative figures a deterioration of the balance. The estimate of the VAT revenue is based on a simplified assumption.

This should not be taken to mean that any type of employee tax credit must do better than any set of targeted incentives. One of the most important arguments in favour of targeted incentives is that they may help to filter out workers whose earnings are underreported (officially earning the minimum wage but receiving payments in cash), and thus may help reduce tax avoidance. Anoth-

er argument for targeted incentives may be that they are not phased out, thus they do not increase marginal tax rates in the phase-out region – even though the hypothetical employee tax credit in our simulations is phased out at lower-to-middle income levels and (as argued in *Chapter 2* of *In Focus – I*) marginal tax rates have minimal or no effect on the labour supply at those income levels. An argument in favour of tax credits, in turn, may be that low market wages define sufficiently well which groups need incentives: it is likely that many people who are out of employment would earn relatively low wages: not enough to compensate for lost transfers and other non-labour income. Increasing their gains-to-work may target the incentives just right.

In this comparison the difference between the employee tax credit and the "Job Protection" measures is due to two main reasons: On the one hand, the tax credit affects a larger number of low-paid workers and exactly those to whom it matters most in terms of relative income. On the other hand the "Job Protection" measures provide contribution relief to other workers for whom the incentive effect is not relevant (such as higher-paid women returning after maternity leave or the highly skilled and highly paid employees under 25 or over 55).

Revenue-neutral reform packages

The three scenarios presented in *Table 4.2* describe policy packages that have a nearly neutral fiscal effect. The simulations were taken from the working paper by *Benczúr et al.* (2012a). The benchmark in this case is the tax system of 2008. The first pair of columns present an across-the-board Personal Income Tax (PIT) cut financed by an increase of the Corporate Income Tax (CIT). The second scenario assumes that the PIT cut is financed by transfer cuts, more specifically the elimination of the possibility of early retirement. In the third pair of columns a similar transfer cut is combined with a cut in the CIT.

The first pair of columns indicate that a revenue-neutral package consisting of an across-the-board PIT cut and a CIT increase has a negative impact on the GDP. The reason is that capital supply is almost perfectly elastic in our model, whereas the reaction of labour supply to changes in taxation is a lot less elastic. Therefore, increases in labour supply that result from lower personal income taxation cannot counterbalance the decline in capital supply brought about by the increase of capital taxation, and therefore total production declines. However, the manner in which the PIT cut is implemented is important. Increased revenues from a higher CIT tax might make it possible to cut the PIT in a targeted way so as to achieve a positive overall GDP-effect.[4]

In the scenarios presented in the second and third pair of columns income and capital tax cuts are financed by cuts to social transfers. For the model, transfer cuts mean savings for the government budget *and* increasing labour incentives at the same time. Other, potentially counterveiling effects of transfer cuts are not taken into account in the model (see our discussion of the model's limita-

4 If the PIT cut is concentrated at high incomes, there might be cases when the GDP impact of the increased labour supply resulting from adjustment at the intensive margin is greater than the decline in output caused by the increase in the CIT.

tions above for more detail). Therefore in this simple framework transfer cuts have a clear and positive effect on both the labour market and the budget. The results suggest that employment increases more if the budget savings from transfer cuts are spent on PIT relief, while the capital stock and GDP increase more if they are spent on CIT relief.

Table 4.2: Revenue-neutral policy packages

	CIT increase[a] and PIT cut[b]		Elimination of early retirement[c] and PIT cut[b]		Elimination of early retirement[c] and CIT cut[a]	
	static	dynamic	static	dynamic	static	dynamic
Macroeconomic effects (difference from the benchmark in per-cent, levels)						
Effective labour		0.7		4.4		3.7
Employment		0.1		4.1		3.9
Capital stock		–6.7		3.6		10.1
GDP		–1.9		4.1		5.9
Gross average wage		–3.2		–0.3		2.8
Disposable income		1.3		2.8		1.4
Fiscal effects (HUF billion, 2010 prices)						
Personal income tax	–253	–318	–260	–195	–7	146
Employee contributions	0	–30	1	53	1	84
Employer contributions	0	–70	0	103	0	173
Taxes on consumption	46	21	3	46	–42	22
Taxes on corporations	234	204	0	26	–234	–178
Taxes on sales	0	–9	0	19	0	28
Transfers	0	1	241	255	238	249
Change of budget balance	27	–201	–14	307	–44	523

[a] The CIT increase was calibrated as an increase of the effective tax rate on capital from 0.073 to 0.098; a CIT cut is calibrated as the effective tax rate decreasing to 0.048.

[b] The lower PIT rate (up to HUF 1.7 million) is reduced from 18% to 14.5%, while the upper PIT rate is reduced from 36% to 32.5%; the "extraordinary" top PIT rate (from HUF 7.137 million) decreases from 40% to 36.5%. The ETC makes the minimum wage PIT-exempt: its rate remains equal to the lower PIT rate thus its maximum monthly amount is reduced to HUF 10,005.

[c] In the scenario where the possibility of early retirement is eliminated, retired people under the pension age in our sample lose their entitlement to old age pension in our simulations. In this case static numbers should be interpreted as long-term effects without behavioural reactions.

Note: Positive changes of budget balance indicate an improvement and negative figures a deterioration of the balance. The estimate of the VAT revenue is based on a simplified assumption.

The long-term macro-economic impact of measures introduced since 2010

The next set of simulations assesses the long-term impact of policy measures introduced in the past two years (2013 measures are taken into account as of August 2012, the closing of the Hungarian version of *In Focus – I*). Some of

these measures affect indirect taxes (on consumption, transactions or corporate income) that do not have a direct effect on labour market incentives; the intentional simplicity of the macro module should be taken into account when interpreting the simulated effects of these measures.

Table 4.3: The impact of measures introduced between 2010 and 2013

	Changes in PIT and contributions[a]		Changes in transfers[b]		Other tax changes[c]	
	static	dynamic	static	dynamic	static	dynamic
Macroeconomic effects (difference from the benchmark in per-cent, levels)						
Effective labour		5.0		1.5		0.0
Employment		0.6		2.6		0.3
Capital stock		4.1		1.2		–0.1
GDP		4.7		1.4		0.0
Gross average wage		1.2		–0.1		1.3
Disposable income		7.3		–0.1		–4.2
Fiscal effects (HUF billion, 2010 prices)						
Personal income tax	–420	–340	0	8	0	30
Employee contributions	131	226	–22	–5	0	17
Employer contributions	–184	–48	0	31	–139	–124
Taxes on consumption	57	132	–18	–2	361	377
Taxes on corporations	0	30	0	9	–104	–105
Taxes on sales	0	21	0	6	171	171
Transfers	0	7	115	132	0	4
Change of budget balance	–416	28	75	180	289	370

[a] Elimination of "super-grossing" and the employer tax credit tax credit, abolition of non-taxable transfers, introduction of a flat income tax at a 16 per cent rate, expanded child tax credit, introduction in 2013 of the "Job Protection Program", increase of employee contributions.

[b] Cuts to the amount and maximum duration of the unemployment benefit, extended duration of the less generous type of child care benefit ("GYES") to up to the third birthday of the child.

[c] The simulation was calibrated based on information available in August 2012. Consistently with the government's publicly communicated intentions it was assumed that only one-third of the 2011–2012 bank tax would be made permanent. As of January 2013, this no longer reflects the government's official policy. Other tax changes in the period of 2010–2013 include cuts in the CIT, increases in the VAT and excise duties, the introduction of a tax on phone calls and text messages, the introduction of a tax on financial transactions, increases in the tax on company cars and the tax on insurance policies, the estimated extra revenue from the planned introduction in mid-2013 of an electronic road toll system, and the introduction of an optional new tax regime for small businesses.

Note: Positive changes of budget balance indicate an improvement and negative figures a deterioration of the balance. The estimate of the VAT revenue is based on a simplified assumption.

The first pair of columns in *Table 4.3* present the impact of changes to wage taxes and social security contributions (both on the employee and the employ-

er side). Overall, the measures appear to have the biggest effect by improving incentives for high earners, and to a lesser extent by promoting employment through the general PIT rate cuts, the extention of the child tax credit and the "Job Protection" measures.

The flat, 16 per-cent rate PIT significantly reduced the effective marginal tax rate for high income earners leading to considerable adjustment at the intensive margin in the simulation. Additional labour supply is gradually absorbed by labour demand through the adjustment of the wage rate, resulting in an increased level of effective labour (only a small part of which is new employment, while most is the reflection of adjustment at the intensive margin), capital and output. The elimination of the employee tax credit would, on its own, lead to a 2 per cent decline in employment, but other measures like the general PIT cut, the "Job Protection" program and the expanded child tax credit turn the overall effect into modestly positive territory. The balance of the elimination of the employee tax credit and the "Job Protection" program in terms of employment is simulated to be around minus one per cent, consistent with the results presented in the first sub-chapter, although it should be kept in mind that savings from the abolition of the ETC considerably surpass the cost of the "Job Protection" program. One reason why the ETC was relatively less efficient is that it could be credited against some government transfers (transfers taxed as wage income are typically insurance-type transfers like the unemployment benefit and some maternity benefits), thus its elimination was a tax increase and a transfer cut at the same time. In contrast, the targeted employer contribution relief affects only income from actual work.

Moving to the second pair of columns, the cuts in the amount and duration of the unemployment benefit significantly increase employment in our simulation; as we noted above, this result should be considered as an upper estimate and treated with great caution. The model takes into account only the financial incentive effect of transfers and ignores all other, potentially relevant effects. These might be particularly relevant in the case of the unemployment benefit: while reducing the duration of the assistance creates a stronger incentive for job search, and thus might reduce the reservation wage of job seekers, the matching of employees and employers might be affected negatively if the duration of the assistance is too short.[5]

The last pair of columns indicate the cumulative effect of other changes that are not directly related to labour taxation and transfers. The reduction of labour taxation (first pair of columns) and the CIT of businesses with revenue lower than HUF 500 million (approximately EUR 1.85 million) were offset mainly by increases in taxes on consumption (including the VAT, excise duties, the part of the new taxes on financial transactions and telecommunication services that falls on household consumption) and to a lesser extent by taxes paid by businesses on their inputs which we interpreted as taxes on sales (the

5 Most of the structural unemployment is the result of such labour market frictions and inefficiencies.

part of the new taxes on financial transactions and telecommunication services paid by businesses as well as additional charges related to the introduction of the electronic road toll system).[6] Despite the positive budget balance, the overall impact on the real economy is almost neutral because value-added type consumption taxes have a more limited impact on the real economy than labour and capital taxes. The moderate positive employment effect is due to the new options introduced in the taxation of small businesses. However, due to technical limitations, this was modelled in a very simplified way, as the reduction of the effective employer contribution rate from 27% to 16% to a specific group of businesses.

The cumulative effect of all measures assessed is displayed in the first pair of columns of *Table 4.4*. Individual measures may strengthen or weaken each other's effect, therefore the cumulative effect may be different from the sum of effects in *Table 4.3* (for example, the elimination of the ETC *after* the transfer cus has a lower impact on the transfer side and will thus have a greater negative effect on employment). The balance of effective labour, capital and GDP is clearly positive, the employment effect largely caused by the simulated effect of the unemployment benefit cuts: in a simulation without these measures employment would decline by 0.13 per cent.

Table 4.4: The full 2010–2013 package and hypothetical risk-premium shocks

	Measures between 2010–2013		Risk premium of +50 basis points	Risk premium of +100 basis points
	static	dynamic	dynamic	dynamic
Macroeconomic effects (difference from the benchmark in per-cent, levels)				
Effective labour		4.6	4.3	3.0
Employment		2.6	1.5	0.9
Capital stock		3.7	-5.5	-15.4
GDP		4.3	0.9	-3.5
Gross average wage		2.3	-1.6	-5.4
Disposable income		1.7	-1.1	-4.5
Fiscal effects (HUF billion, 2010 prices)				
Personal income tax	-405	-319	-374	-440
Employee contributions	105	205	141	67
Employer contributions	-293	-164	-257	-368
Taxes on consumption	404	504	441	366
Taxes on corporations	-103	-76	-120	-170
Taxes on sales	169	195	174	147
Transfers	103	119	113	109
Change of budget balance	-20	463	117	-290

Note: Positive changes of budget balance indicate an improvement and negative figures a deterioration of the balance. The estimate of the VAT revenue is based on a simplified assumption.

6 In the calibration of the model we calculated an effective tax rate on consumption, including both value-added and transaction-type taxes. While the first influences only real labour incomes, the latter influences both real labour and capital incomes.

The third and fourth columns of *Table 4.4* present scenarios where, in addition to the effects of the complete set of economic policy measures, the required return on capital invested in Hungary goes up by 50 or 100 basis points. The required return can increase as a result of a riskier economic environment or if investors consider sectoral surtaxes, the effective nationalisation of private pension funds or retroactive taxation as signs of a permanent increase in uncertainty. It is not surprising that in a small open economy capital is very responsive to increases in the required return on capital, and a downward adjustment of the capital stock results in the decline of output and wages. The increase of the required returns has a more moderate impact on the labour market: an increase of 100 basis points reduces effective labour supply by just over 1.5 percentage points, while changes in the capital stock and GDP are much greater. According to these admittedly simplified calculations, an increase of 80 basis points in the required return wipes out the potential growth-enhancing effect of all other measures within the last two years.

Concluding remarks

This chapter has provided an overview of the international and Hungarian applications of microsimulation methods and briefly presented the microsimulation model created by Péter Benczúr, Gábor Kátay and Áron Kiss at MNB. This model has been used to analyse the employment and macroeconomic effects of hypothetical and actual changes to the Hungarian taxes and transfer system.

Summarising the findings of the different impact assessments, the first part compared three alternative ways of promoting the employment of low-income groups that are characterised by a low employment rate. It has been shown that the introduction of a zero per cent tax rate up to the minimum wage performs less well than if the minimnum wage is made tax exempt by an employee tax credit. Using a simple parametric example it has been shown that a limited employee tax credit that can be credited only against wage income (and not against government transfers) and is phased out rapidly above the minimum wage (two aspects in which this particular variant is more restrictive than the actual ETC in Hungary between 2003 and 2011) would probably have a higher employment impact with a similar static fiscal cost than the "Job Protection Program" entering into force in 2013. In terms of employment level, the balance of the elimination of the ETC and the introduction of the "Job Protection Program" is approximately minus one per cent, although the fiscal balance of both measures is positive. The relatively small employment effect of the ETC compared to its cost is mainly due to the fact that until 2011 it could be credited against some government transfers, thus its elimination meant a PIT increase and a transfer cut at the same time.

The second set of simulations analysed the impact of revenue-neutral policy packages. The simulations have shown that the increase of capital taxes in

a small open economy (where capital supply is nearly perfectly elastic in the long run) has a significant negative impact on both the capital stock and output. Therefore, while financing labour tax cuts by capital tax hikes increases effective labour, it has a negative impact on GDP. Transfer cuts always have a positive impact in our model because they mean savings for the government budget and improved work incentives for the groups affected at the same time. As we have discussed in detail, this is due to the fact that the model only takes into account the role of transfers as financial incentives and ignores potential negative countervailing effects.

Finally, we have attempted to assess the potential long-term macroeconomic effects of the most important tax and transfer measures introduced in the period of 2010–2013. In the simulations the strongest effect of the policy package is to improve incentives for high earners and thereby increase the effective labour supply at the intensive margin. The employment impact of the whole policy package is moderate: the effect of tax changes is somewhat negative; the only substantial positive effect in the simulations appears to come from the cuts of the unemployment benefit. A permanent increase of the expected return on capital investments could easily turn negative the growth-enhancing effects of all other measures combined.

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5. LABOUR DEMAND EFFECTS OF TAXES AND TRANSFERS

5.1 A theoretical framework for measuring labour demand effects

ÁRPÁD FÖLDESSY & ÁGOTA SCHARLE

In the standard model of economics, the wage elasticity of labour demand depends on the elasticity of substitution between the factors of production (capital and labour), the price elasticity of the final product, the share of labour output within the total production cost, and the price elasticity of the other factors of production.[1] Thus, the labour demand of a firm mainly depends on the price of its product, the wage level, and the productivity of the workers. It will hire additional labour until the return on their product (marginal productivity) is higher than the wage cost. The wage elasticity of labour demand in the long run (when capital adjusts as well) equals the elasticity of substitution between labour and capital.[2]

In reality, the labour market is more complex than the above model, for several reasons. Human labour, which is the product on this market, is inseparable from the people who do the work; therefore, supply and demand does not only depend on wages. People are not all alike, and employers cannot always measure their exact productivity. Firms often operate on non-competitive markets, which make them monopolies to some extent, and as such, they can influence the prices of their products and/or the level of wages as well. The state regulates the labour market much more thoroughly than others: it determines the terms of layoffs and the maximum of working hours, it levies various taxes and contributions on wages, and sets the minimum wage. These peculiarities increase the cost of hiring and firing – for both parties.

This chapter explores the labour demand effects of social security contributions, which are one of the main tools of state regulation of the labour market. The ensuing subchapters briefly summarise earlier empirical evidence and provide a more detailed account of recent results.

In order to place these results into a common conceptual framework, let us return to the simple model presented in *Figure 1.2* of *Chapter 1* (Introduction), which shows employment on the horizontal axis, and wage on the vertical axis.[3] The demand curve is downward sloping: the higher the total wage cost, the lower the number of workers employed by the firm. The supply curve, however, is upward sloping: the higher the net wage, the higher the number of people who want to work. The two panels of the figure differ in the wage elasticity of labour demand: a given change in wages induces a smaller increase in

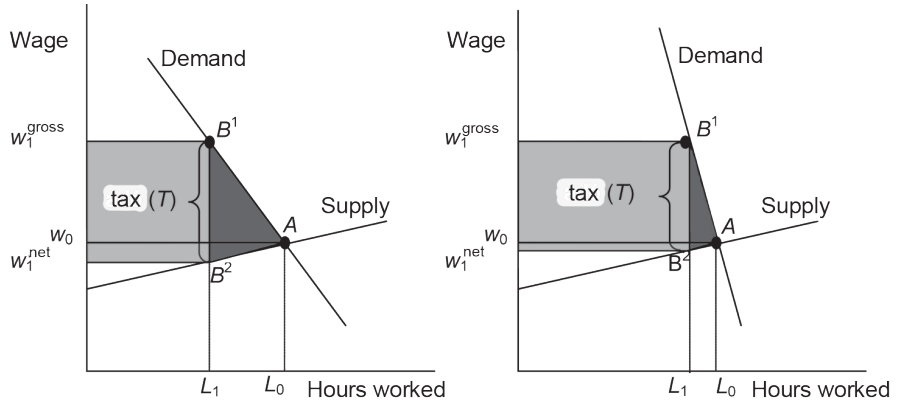
1 For the derivation of the labour demand curve see e.g. *Bosworth et al.* (1996).

2 To be precise: this statement assumes a two factor CES production function with constant returns to scale.

3 The next couple of paragraphs are based on *Scharle et al.* (2010).

labour demand in the right panel (i.e. the elasticity is lower). Market equilibrium occurs where demand equals supply at a given wage (point *A* in the figure, L_0). At this point, the total cost of labour equals the net wage (w_0).

Figure 5.1.1: Equilibrium of labour demand and supply with a unit tax on labour



Let us now introduce a unit tax of *T*. In this case the new equilibrium occurs at the employment level (L_1) where the difference between the gross and the net wage equals the tax ($T = B_1 - B_2$).[4] Without supply and demand adjustment, public revenue would equal $T \times L_0$, but the introduction of the tax decreases employment, therefore, the actual revenue is going to be $T \times L_1 < T \times L_0$.

How is the newly introduced tax burden shared between workers and employers? The figure shows that the gross wage increases by ($w_1^{gross} - w_0$), while the net wage decreases by ($w_0 - w_1^{net}$), and their relative magnitude depends on the *relative* slope of the demand and supply curves.

The existing empirical evidence suggests that the wage elasticity of labour demand in Hungary is in the middle range by international comparison. Although *Köllő* (1998) finds a relatively low parameter value (–0.17) for the period following the regime change, later studies based on micro-level data reveal an elasticity of around –0.5 and –0.8, in line with comparable estimates for mature market economies (*Kőrösi*, 2002a). *Jakab and Kaponya* (2010) use macro-level data for VAR-estimations and find a long-term partial effect of a similar magnitude (–0.67). The elasticity of substitution between capital and labour can also be identified using the investment equation, since – maintaining the assumption of a neoclassical environment – the price elasticity of capital demand equals the elasticity of substitution between inputs. According to an estimation based on the investment equation in *Kátay and Wolf* (2004), this long-term elasticity is –0.8, which is close to the estimates based on a labour demand equation.

The elasticity of demand for labour is highest at low wages – i.e., among the low-skilled. *Kertesi and Köllő* (2003) analyse firms' labour demand for 2000–

4 This result is independent of the legal incidence of the tax (i.e. who should be paying it) – see also *Subchapter 5.5*.

2001 with models distinguishing between three types of labour (unskilled, young–skilled, and older–skilled). The demand for unskilled labour (workers with lower secondary education or less) is much more elastic to wages: in the short run, a 1 per cent increase in wages is associated with a 0.4 per cent decrease in the demand for labour by firms, while this decrease stays below 0.2 per cent for skilled labour. These values are relatively low, but fall within the normal range for developed market economies (*Hamermesh*, 1993). The time series analyses of the demand for blue- and white-collar labour by *Tarjáni* (2004) for the years between 1992 and 2002 yield similar results.[5] Thus, a decreasing of tax burdens is likely to affect the employment of the low skilled, which is where the gap between Hungary and the EU 15 is most apparent.

The four subchapters of this chapter extend these findings in three separate directions. *Subchapter 5.2* reviews the results of earlier studies on wage subsidies. *Subchapter 5.3* – by presenting the results of a new paper – analyses how targeted wage subsidies for specific groups of workers affect the labour demand for the given group. *Subchapter 5.4* reviews the options for differentiating the minimum wage – which functions as a lump-sum tax on unskilled labour – in order to reduce its negative effect on demand. Finally, *Subchapter 5.5* gives a brief review of the international literature on the effect of social security contributions depending on whether they are paid by workers or employers.

5.2 The impact of previous wage subsidy programmes on employment

PÉTER GALASI & GYULA NAGY

Few studies examined the impact of wage subsidy programmes on employment in Hungary in the second half of the 1990s and the first half of the 2000s. The main characteristics of these studies are reviewed by *Cseres-Gergely and Scharle* (2012) (particularly: *Table 7.A2*, p. 171). This chapter provides a brief overview of the main findings of these studies.

Wage subsidy programmes were characterised by the following in the given period: employers were eligible for a subsidy of up to half of the wage cost for a maximum period of one year if they hired workers who had been registered as unemployed for at least six months (in the case of new entrants for at least three months) and retained them in work for at least twice the duration of the subsidy. Each year approximately 10–30 thousand people participated in wage subsidy programmes (October closing headcount) in the given period, and three months after leaving the programme 60–70% of participants were in non-subsidised employment (*MTA KTI,* 2012).

The first *programme impact evaluation* using control groups took place in the mid-1990s (1995–1997) as part of a project funded by the World Bank. In addition to research, the World Bank project also concentrated on development

5 See also *Galasi (2002)* on labour supply in Hungary and *Kőrösi* (2002b, 2005) on labour demand.

and created the monitoring system for active labour market measures in the employment office. The findings of this research are presented here based on *O'Leary* (1998).

In addition to wage subsidies, the research also included other programmes. The sample was selected from the unemployed register and the sample consisted of 1,000–1,500 participants per programme. The number of participants in the control group was approximately 4,500 people. All programme and control group samples were representative. The first observation took place in the second quarter of 1996 and the second observation in the first half of 1997. This design allowed registering the labour market status of all participants in programme and control groups at two distinct time points, as well as any changes over a minimum of six months.

Four outcome indicators (that measured the impact of programmes) were defined: 1) the individual was employed in a non-subsidised job or was self-employed at any point during the observation period (JOB1); 2) the individual was employed or self-employed with or without support at any point during the observation period (JOB2); 3) the individual was employed in a non-subsidised job or self-employed at the second observation (JOB3); 4) the individual was employed or self-employed with or without support at the second observation (JOB4).

The impact of programmes was measured using three methods. All estimation methods were based on the assumption of conditional independence, thus the methods did not deal with the issue of unobserved heterogeneity between groups.

First, the means of the outcome variables for programme participants (treatment) and control groups were compared (unadjusted programme effect). In reality this method does not measure the effectiveness of programmes because the results include the effects of both observed and unobserved heterogeneity between groups; however they are useful as a comparison with the results of other methods to see how well they dealt with the effect of differences in the composition of groups.

Second, the impact of programmes was estimated using regressions: with the outcome variable on the left, other observed variables on the right and a dummy variable of programme participation. In this case the programme impact is indicated by the coefficient of the programme participation variable estimated with different regression procedures. The procedure was repeated with an added interaction variable on the right side that indicated whether the participant received any other assistance from the job centre in addition to the programme. The estimation was carried out using the method of least squares; when estimating successful job finding as a dependent variable this is known as "linear probability model" in the literature.

Third, the impact of the programme was estimated using the method of matched pairs. The essence of this method is that each participant in the treat-

ment group is matched with at least one participant from the control group who is identical or very similar in terms of observable indicators. If the matching is successful, the impact of the programme is the mean difference between the values of the outcome variable of the matched pairs. The similarity or the difference of individuals is computed using a method estimating multi-dimensional distance. In this case *Mahalanobis distance* was used to calculate the distance between individuals.

Around 35 descriptive variables indicating the participants' socio-demographic characteristics, educational attainment, previous labour market history, previous and current occupations, and desired occupations, the characteristics of household (demographics, number of children, household income) and dummy variables for counties were used as independent or matching variables.

Table 5.2.1 gives a summary of the estimated values of main programme effects and their significance. Negative values and non-significant estimates indicate that the programme has no positive impact on a specific outcome variable as measured by a certain method.

Table 5.2.1: Wage subsidies – net programme effects

	Wage subsidy	
	effect	*t* value
Unadjusted effect		
JOB1	0.17	9.96
JOB2	0.24	14.42
JOB3	0.20	11.90
JOB4	0.21	12.60
Adjusted effect using regression		
JOB1	–0.09	4.68
JOB2	0.00	0.06
JOB3	–0.02	1.12
JOB4	0.00	0.11
Effect calculated using matched-pairs method		
JOB1	–0.10	5.57
JOB2	–0.02	1.32
JOB3	–0.02	1.23
JOB4	–0.01	0.31

JOB1: the individual was employed in a non-subsidised job or was self-employed at any point during the observation period. JOB2: the individual was employed or self-employed with or without support at any point during the observation period. JOB3: the individual was employed in a non-subsidised job or self-employed at the second observation. JOB4: the individual was employed or self-employed with or without support at the second observation.

Source: *O'Leary* (1998).

Only positive and significant effects suggest that the programme had a measurable and quantifiable impact on a specific outcome indicator as measured by a

given method. The programme outcome indicating the success of job finding can be interpreted as the estimated mean difference between the employment probabilities of the two groups.

The unadjusted effects are significant and positive; or to put it differently, programme participants are more likely to obtain employment than the control group. However, if we control for the effect of observed variables– using regression or matched pairs methods –, then these effects partly disappear or change direction (significant and negative). Therefore, it can be concluded that the observed job finding advantage among participants of wage subsidy programmes compared to the control group is due to the more favourable observable characteristics of the participant group. Thus the programme has no positive impact on the employment probabilities of participants.

The impact of wage subsidy on job finding was also addressed by other studies (*Galasi, Lázár and Nagy,* 1999, *Galasi and Nagy,* 2005); however these cannot be considered programme impact evaluations because they did not use control groups and their estimation methods (limited dependent variable models and duration models) are not suitable for calculating programme effects.

The study by *Galasi, Lázár and Nagy* (1999) was based on the empirical database used by *O'Leary* (1998) and set out to measure the relative success of three active programmes (wage subsidy, business start-up and public works) concentrating on the observable characteristics of participants. The outcome variable was the probability of job-finding among participants. Job-finding was defined as an unemployed person taking up non-subsidised employment or working as self-employed in their own business.

The authors estimated a logistic probability (logit) model where the probability of job-finding was on the left and on the right were age groups, educational attainment (binary variable), binary programme variables (reference: public works) and the methods used for job search. In addition they added a binary variable to the explanatory variables, the value of which was one if after leaving the programme the individual claimed unemployment benefit, and zero in all other cases. The model also included some household characteristics of the participants (such as household income, number of dependants and family members in employment) as well as the employment rate of the "small region" to indicate the local labour market situation.

The model is suitable to assess the impact of each programme on the probability of job-finding independently from the observed characteristics of participants and the local labour market situation. The parameter estimation for the binary programme variables suggested that both business start-up and wage subsidy programmes are more effective than public works (as measured by the probability of job-finding), and business start-up subsidy is more effective than wage subsidy.

Galasi and Nagy (2005) examined trends in the employment probability of the long-term unemployed taking part in wage subsidy and training programmes over a four-year period between 2002 and 2005, using the monitoring database of active measures. Here only findings related to wage subsidy programmes are presented. In the monitoring of active measures information about the employment situation of the individual was collected using survey methods at the end of the third month after exit from the programme. Therefore in a way it measured the short-term impact of programmes. This survey did not have a control group, however information was available about participants in each programme. For participants of wage subsidy programmes the follow-up questionnaire was answered by employers. The questionnaire only asked whether the individual was still employed by the same employer at follow up. (There was no information as to whether the individual worked elsewhere.) Therefore the remainder discussed the probability of being retained in work.

Around 62–64% of participants leaving the programme were retained in work. It is possible that some of those who were not retained by their employer in the programme found employment elsewhere; therefore the results provided information about the lower limit of employment probability. Even if there had been information on the job-finding of all programme participants, given the short time scale of the evaluation between exit and follow-up, this would have only measured the short-term impact of the programme. Another issue was the high rate of non-response: 23–28%. Therefore there might be a selection bias in the final sample, and for this reason the authors estimated the probability of being retained in work using a binomial probit model. Technically this estimates two equations – returning the questionnaire and employment – the error terms of which are correlated with each other if there is a self-selection bias. Statistical tests indicated that the assumption of self-selection was indeed correct in most cases. On the right side of the "retention in work" equation were gender, educational attainment, age, occupation, counties, local unemployment rate and the duration of the subsidy (less than 180 days, 180–270 days, 271–360 days, 361–540 days, more than 540 days). Estimations were carried out for each year and also pairs of years (2002–2003, 2004–2005).

Findings indicated that there was a weak but significant correlation between gender and the probability of being retained in work. Women were slightly more likely to be retained by their employers than men. The relationship was stable over time and women's advantage in terms of job retention was around three per cent. The effect of age was significant and positive in each year, the youngest age group (under 25) was less likely to be retained in their job than other age groups; there were no systematic (permanent over time) differences between the retention probabilities of other age groups.

The authors found significant differences also by educational attainment, using primary school education as a reference for comparison with other edu-

cation levels. Programme participants without completed primary education were the least likely to be retained in work and higher than primary education was an advantage in most cases. Most equations indicated that those with a vocational secondary education had the highest relative chances, and those with a tertiary education had no, or diminishing, advantage over time compared to participants with a primary education.

As far as the duration of the wage subsidy was concerned, wage subsidies that lasted 180–270 days were associated with higher probability of retention than wage subsidies for less than 180 days. This was the only stable result over time: all parameters are positive and significant. Apart from this, there were many non-significant parameter estimates that suggested that the duration of the wage subsidy had no impact on the probability of retention. There were only two occupations that were significantly associated with retention in work after exit from the programme. The estimation of parameters in all equations was negative and significant for semi-skilled occupations (such as jobs in material handling, janitor, clerical assistants), and similar results were found for manual labour jobs in the construction industry.

Finally, in less favourable labour market conditions (indicated by a higher local unemployment rate) the probability of retention declined. This relationship was very strong each year, however it was getting somewhat weaker over time, and (the absolute value of) the parameter decreased: while in 2002 it was nearly –0.72, in 2005 only –0.30.

Summarising briefly the main findings of studies looking at the impact of wage subsidy programmes, two main conclusions can be put forward: first, according to the only programme impact evaluation study in Hungary these programmes did not improve employment chances in the mid-1990s; second, there were differences in the probability of being retained in work among participants of wage subsidy programmes according to gender, age group and educational attainment: women, those over 25, and with higher than primary school education were more likely to be retained by the employer who received the wage subsidy, than men, those aged 25 years or younger and with a primary education or lower.

5.3 The impact of a wage subsidy for older workers

ZSOMBOR CSERES-GERGELY, ÁGOTA SCHARLE & ÁRPÁD FÖLDESSY

The importance of targeted wage subsidies

Voucher-type targeted wage subsidies reduce wage costs for specific groups of workers for a limited period and can be accessed at no or very low cost for the employer. Due to their targeted nature, they are cheaper to implement than across the board cuts in taxes or social security contributions. The low administrative cost makes them more appealing to employers compared to traditional wage subsidies, which typically involve a lengthy application process and also depend on the discretion of a public official who allocates the limited resources available for such grants.

Providing a targeted and temporary wage subsidy can be effective in two cases: 1) for workers lacking sufficient experience and 2) for workers subject to discrimination.[6] In the first case the subsidy compensates the employer for the low productivity of an inexperienced worker and also allows the worker to acquire some experience during the subsidised period so that they can retain the job after the subsidy has expired. In the second case, the subsidy compensates for the risk of hiring someone with (perceived) low productivity. If, for example, employers think that long term unemployment is a sign of lower productivity (at least on average), a temporary subsidy can make them more open to hiring long term jobseekers and testing their productivity in practice. Some of the newly hired workers will prove to be equally productive and will retain their jobs,[7] while others may prove less productive and lose their jobs. But even in the latter case, the subsidy removed them from the discriminated group and allowed them to acquire some work experience.

The recent global financial crisis has increased the policy relevance of wage subsidies as a means of preventing the rise of long-term unemployment and speeding up recovery. Such subsidies are especially relevant for new Member States struggling to meet EU employment targets.

In this subchapter we summarise new evidence on the *Start extra* scheme, a voucher-type targeted wage subsidy for older workers introduced in Hungary in 2007, based on the recent results of *Cseres-Gergely et al.* (2012). *Start extra* is very similar to the targeted payroll tax subsidies in Belgium and Finland and a targeted tax credit in the US, which earlier studies have shown to have some positive impact.[8]

Potential limitations in programme efficiency

According to *Kluve* (2010), wage subsidies and services/sanctions are the most effective in increasing re-employment rates. The effectiveness of wage subsidies however has been questioned on several accounts. First, not all empirical

6 See *Lovász* (2012) for an explanation and a summary of empirical evidence from Hungary.

7 This follows from the nature of statistical discrimination: while long term jobseekers may on average be less productive, long term unemployment is not a deterministic feature, i.e. there is considerable variation in workers' productivity within the group.

8 For a review of the international evidence, see *Cseres-Gergely et al.* (2012).

studies found positive and significant effects. In fact, the few existing papers on transition countries have all shown a neutral or negative impact (*Kluve,* 2010, *Betcherman et al.* 2004). Second, wage subsidies are relatively expensive, which implies that the magnitude of their effect is as important as its sign, i.e. only a relatively large impact can make such programmes cost effective. Third, the narrow targeting of subsidies may stigmatise recipients and reduce both take-up and effects (*Katz* 1996). Fourth, deadweight and substitution costs are likely to be high (*Betcherman et al.* 2004). Deadweight loss occurs when individuals who would have been able to find a job anyway absorb the subsidy. Substitution occurs when employers dismiss non-subsidised workers in order to replace them with subsidised ones. Both reduce the efficiency of subsidies, and, unless accounted for, will also distort the estimates of their net impact.

The design of the Start extra scheme

The *Start extra* scheme was introduced in 2007 as an extension to an existing scheme for school leavers, and was phased out in 2012. It was a quasi-voucher scheme that offered a temporary reduction on payroll tax (social security contributions) to employers hiring the holder of the "voucher". The amount of the subsidy varied across eligible groups, as summarised in *Table 5.3.1* All long-term unemployed were eligible for *Start plusz*, and *Start extra* doubled the subsidy for a selected subgroup with multiple disadvantages, i.e. for jobseekers above 50 and those who had only completed primary education.

Table 5.3.1: Rules of the various Start schemes at the time of introduction

Name	Eligibility	Amount of subsidy (% of total wage cost)*		Ceiling on subsidy
		1st year	2nd year	
Start	School leavers: below 25 (30 for graduates), no prior paid job	14	7	1.5 × minimum wage (2 × for graduates)
Start plusz	On parental leave or care allowance, or registered unemployed for 12 months within preceding 16 months, not eligible for old age pension			2 × minimum wage
Start extra	Over 50 or primary education only, and registered unemployed for 12 months within preceding 16 months, not eligible for old age pension	25	14	2 × minimum wage

* In 2007, the employer's contribution was 32% of the gross wage, and this was waived in full during the first year of employing a person with a *Start extra* voucher. The flat rate health contribution was waived in both years in all schemes, which was 1,950 HUF a month (about 8 EUR), or around 3% of the minimum wage. The subsidy was further extended in 2009 and replaced by a new scheme in 2012.

The scheme (all three variants) had been administered by the tax authority who issued a plastic card to eligible persons which indicated the type and eligibil-

ity period of the subsidy. Cards were issued only if claimed, but the evaluation of claims was automatic, and local job centres had been actively encouraging job seekers to claim the card.

The validity of the card and thus the period of eligibility started on the day of issue. Jobseekers were therefore advised to claim the card immediately before starting their job, so that their employer would be eligible for the maximum length of the subsidy. The subsidy lasted for a maximum of two years.

Between July 2007 and December 2008, the *Start extra* card was claimed by 8,859 persons and issued to 8,392 persons. Less than 2% of the claims were declined by the tax authority, and some 5% was not issued for other, unknown reasons. During the same period, the number of persons employed with the subsidy started to grew steadily, peaking at 4,998 in November 2008. This suggests that most cards had been claimed once the job seekers had a job offer, as recommended by job centres. Until the end of 2008, 6,115 persons had been hired with the *Start extra* card, and of that, 3,127 were long-term jobseekers aged over 50 with at least secondary education.

The *Start extra* subsidy is well targeted considering that re-employment probabilities are significantly lower for uneducated and older job seekers. Demand for older workers declined significantly in the 1990s, partly due to the sharp drop in their relative productivity and also due to discrimination (see *Lovász*, 2012 for a review of empirical evidence). There is also some evidence that wage subsidies are more effective if targeted at the long-term unemployed (as in the *Start extra* scheme) rather than at low-ability workers (*Brown at al.*, 2011).

The employment and wage impact of the Start extra scheme for older workers

There are very few empirical studies on Hungarian active labour market programmes and the two earlier papers that evaluate the impact of traditional wage subsidies have somewhat conflicting results.[9] As far as we know, *Cseres-Gergely et al.* (2012) was the first attempt to evaluate the re-employment effect of the *Start* schemes.

Cseres-Gergely et al. (2012) estimate the effect of the *Start extra* subsidy for older workers with at least a secondary education, exploiting the particular design of the scheme, i.e. that it is available for jobseekers aged 50 or above, but excludes otherwise similar jobseekers aged just below 50. They find a significant positive effect on both re-employment probabilities and wages in the case of men aged over 50, but no significant effect for women. Their estimates are interpreted as the *additional* effect of the extra subsidy (on top of the base subsidy of *Start plusz*) for multiply disadvantaged groups.

The dataset they use was drawn from administrative records, constructed for the Institute of Economics, Research Centre for Economic and Regional

9 *O'Leary* (1998) found negative or zero employment effects and a significant increase in earnings on the first job, except for job seekers aged over 45, where effects on employment were also positive and significant. Using data for 2010, *Csoba and Nagy* (2012) estimated a 24-fold increase in log-odds of employment, which is a dubiously large effect.

Studies of the Hungarian Academy of Sciences (IE-CERS HAS), containing a 50% random sample of the total working age population. It is a panel of the employment and job search history of working age individuals covering the period between January 2002 and December 2008. Thus, jobseekers are observed for 18 months following the introduction of the programme. There is information on age, sex, dates of entering and exiting employment, earnings (pension insurance records), unemployment history and type and period of receiving various transfers (including disability benefits) and sick leave. There is no data on the actual claiming the Start cards or on the employer.

In the case of older workers, the programme design generates a discontinuity in eligibility, which can be used to identify the programme effect. In this case, the treatment group is formed by those eligible for participation and are slightly above the age 50, while the control group is formed by those who are similar to them in all aspects, but stay slightly below age 50 during the observation period. Those with at most primary education must be excluded, as they are eligible for the same support regardless of age.

The discontinuity design strategy assumes that heterogeneity in the variable with the discontinuity is irrelevant in determining outcomes. This is not completely so in this case, as age tends to reduce the chance of re-employment, but we can account for this in the estimation strategy by using a precise age measure.[10] Although age is changing over time, it has an almost fixed distribution in adjacent time-points. Because of this and because the discontinuity design provides us with randomly allocated treatment and control groups, this strategy yields consistent estimates of the programme effects. If the differential effect of extraneous factors on outcomes over time (such as seasonality or the business cycle) is to be taken into account separately from unemployment duration, it has to be controlled for using some statistical method, such as a difference in differences strategy, where we look at the difference between the control and the treatment outcomes before and after the programme.

Treatment is defined as eligibility for the Start card. This is not only a pragmatic decision taken due to the lack of better data, but is also justified on the basis of the official information on claims, take-up and subsequent employment, which suggest that claiming the voucher is most likely to happen after the outcome, that is, after the employer decided to hire the job seeker. "True" take-up therefore is not actual participation, but the ability to participate: being informed of the scheme and of the age condition by either the employer or the job seeker.

Based on the above considerations, *Cseres-Gergely et al.* (2012) define the treatment group as those aged between 50 and 52.5 and the control group includes those aged between 45.5 and 48.5 in June 2007. The 18-month gap between them ensures that no member of the control group becomes eligible for participation during the observed period. In other respects the two groups

10 We also check the presence of the effect by repeating the estimation for age groups below and above the eligibility threshold, before and after the programme was made available.

both fulfill the eligibility criteria at the time the scheme was introduced, i.e. they have accumulated 12 months of registered unemployment.

Re-employment effects are estimated in various specifications: probits for the probability of being employed 15 or 18 months after the introduction of the scheme and duration models (a modified Jenkins type probit) for the probability of exit to a job at any time after the introduction of the scheme (*Jenkins*, 1995). Wage effects are estimated in standard Mincer-type wage equations, where they use the interaction of the treatment dummy and a dummy indicating spells after the introduction of the programme. This is interpreted as the programme effect, i.e. as a shift in the wage advantage (or more likely, disadvantage) of older jobseekers re-entering employment.

The average marginal effects on employment estimated in various model specifications tend to be small but positive and significant for men, and insignificant for women. The first two columns of *Table 5.3.2* show the increase in participants' employment probability compared to non-participants 15 and 18 months after the introduction of the program, respectively, controlling for individual and regional characteristics and for seasonality. The former is included as a test of whether the global crisis starting in late 2008 may have affected the programme. The third column shows the increase in participants' probability of *entering* a job, controlling for changing overall job-entry chances over time, besides controls listed above. The fourth column shows the same probability for persons with lower[11] secondary vocational education. Results are robust to the definition of employment and unemployment in the data. The preferred specification (presented below) includes controls for age, education, and past work history.

Table 5.3.2: Employment effects for job seekers aged around 50

	15 months	18 months	Total	Job finding probability for lower secondary vocational
	after the introduction of the program			
Men	0.1040**	0.0782	0.0144***	0.0164**
Women	0.0638	0.1040	0.0016	–0.0034

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Note: See full regression results in *Cseres-Gergely et al.* (2012).

For men, the positive effect is driven by job seekers with lower secondary vocational education, who constitute 74% of the sample. For the higher educated, there is no significant effect, which may be due to the ceiling on the subsidy (which reduces the value of the subsidy at high wages) or possibly to stigma effects, which may be stronger in white collar occupations.

As shown by the coefficient of the interaction of the treatment and the programme period in *Table 5.3.3,* the subsidy for job seekers aged over 50 has a significant positive effect (the effect on the subsequent wages of men).

11 Completed a vocational secondary school that does not offer a school leaving (A level) certificate required for entering university level education.

For women, the subsidy has no significant effect either on employment, or on wages. A possible explanation is that older women are less likely to actively look for a job, which lowers the potential impact of any wage subsidy that is by design dependent on job search and at the same time, it also makes its estimate less precise. An earlier result by *Micklewright and Nagy* (2010) points to a similar direction: they found that a mild tightening of job search criteria for unemployment benefit recipients had a significant positive effect on the probability of re-employment only in the case of women aged over 30.

Table 5.3.3: Wage effects job seekers aged around 50

	Men	Women
Eligibility (aged over 50)	–0.200*	–0.0302
	(0.114)	(0.151)
After June 2007	0.147**	0.340***
	(0.0614)	(0.0933)
Eligibility after June 2007	0.157*	0.0978
	(0.0893)	(0.132)

Note: See full regression results in Tables B3 in the Appendix of *Cseres-Gergely et al.* (2012).
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The above results give gross estimates of the program effect which is valid only if the control group was not affected by the program, for example through a replacement of employees by long-term unemployed similar to them and eligible to the subsidy. As a crude check for substitution effects, *Cseres-Gergely et al.* (2012) examine the probability of becoming unemployed for the employed population around the time of introducing the subsidy and find no significant trend in the job loss probabilities of workers aged below 50 with secondary or higher education. This suggests that substitution is unlikely to lessen the impact of the programme.

The total cost of the scheme is relatively modest, compared e.g. to re-training or public works programmes in Hungary. Between July 2007 and December 2008, the *Start extra* scheme cost a total of 1 billion HUF per annum. This amounts to 593 EUR per person (not controlling for right censoring in employment spells). Neglecting the costs of administration, which are likely to be very low, the cost of the programme is the additional subsidy (on top of *Start Plusz* available to all long term unemployed). The short term benefits of the programme include savings on social assistance expenditure and employee's social security contributions (17% of the gross wage). Long term benefits may include social security contributions following the expiration of the subsidy, longer employment spells in the subsequent work history, postponed retirement and savings on health care costs. For lack of empirical evidence on the magnitude on these long term effects (in Hungary), *Cseres-Gergely et al.* (2012) concentrate on the short term balance.

Cseres-Gergely et al. (2012) conclude that short run benefits exceed the cost if deadweight loss – that is the share of those who would have found a job without the subsidy – is below 20% of subsidised jobs. As a crude measure of the latter, the number of subsidised job entries as recorded by the Tax Authority is compared to the number of entries by potentially eligible job seekers as observed in the dataset. Results suggest that there may be some deadweight in the programme but that it is not very large.

Conclusions and policy implications

Wage subsidies are often promoted as an efficient means of increasing demand for low skilled workers, however, existing evidence on their employment effects is somewhat mixed, especially in the case of transition economies. A recent evaluation of the Hungarian *Start extra* scheme for older workers suggests that well designed targeted wage subsidies can be effective in a transitional context as well. The Hungarian *Start extra* subsidy for jobseekers with at least secondary education and aged over 50 appears to be cost effective for men, even considering its short term benefits only.

The overall efficiency of this programme could be improved by narrowing the target group to jobseekers with less than upper secondary education and possibly by supplementing it with incentives for job search, especially for women. The fact that *Cseres-Gergely et al.* (2012) found no significant effect for educated jobseekers also implies that the recent government plans to cut social security contributions for all workers aged over 50 (regardless of education) is likely to carry considerable deadweight loss. Restricting the measure to those with at most secondary education would improve its cost efficiency.

5.4 The pros and cons of differentiating the minimum wage in Hungary

ÁGOTA SCHARLE & BALÁZS VÁRADI

This subchapter does not present new findings, but aims to summarise what we could expect of a targeted reduction of the minimum wage as a tool for increasing employment, based on existing Hungarian and international literature. The suggested introduction of a lower minimum wage for school leavers, proposed by the Hungarian minister for national economy in June 2012, gives immediate relevance to the subject. We begin with an overview of the functions and effects of the minimum wage as well as the main characteristics of its domestic regulation, with a special focus on the idea of differentiation. We then aim to reconstruct and analyse the reasoning that may buttress the governmental and expert proposals "regarding the differential" modification of the gross minimum wage.[12] Finally, we briefly outline the proposal of Scharle and Váradi (2009), arguing for a regional differentiation of the minimum wage.

12 *Gábor* (2012) and *Köllő* (2012) provide a more comprehensive summary. For a general overview, see *Neumark and Wascher* (2008), for a Hungarian language outline see *Gábor* (2012).

The minimum wage and its effects

The minimum wage is a policy instrument that is widely (though not universally) applied in the developed world. The relevant international literature generally distinguishes between three social functions of minimum wage regulations: 1) achieving social equity, 2) fostering employment and 3) minimising income inequalities. Hungarian national policy often cites a fourth point justifying minimum wage increases: that of reducing tax avoidance.

The first point encapsulates the social expectation that the state should support the most vulnerable employees and that there is a certain amount of remuneration for human labour that employers must not fall short of. According to the International Labour and Employment Relations Association, the basic purpose of the minimum wage is to satisfy this demand (*ILO,* 2009). This function, however, is difficult to describe with the models and empirical analyses of economics. Consequently, the labour economics literature primarily focuses on the effects that changes to the minimum wage have on employment and distributive justice.

The theory regrettably does not provide a definitive answer concerning employment. The simplest among the models of labour economics is the textbook equilibrium model that supposes perfect competition, a positive wage elasticity of labour supply and a negative elasticity of labour demand, applying the Marshallian cross to the labour market. Within this framework there is a definitive impact on employment: the minimum wage is either not binding (if it stays below the equilibrium wage level that is socially optimal), or it causes unemployment and deadweight loss. This is because those employer-employee pairs for whom it would only be worthwhile to sign a contract if they could agree on a wage that is lower than the minimum wage would be deprived of the possibility of such a mutually beneficial transaction. In this model, then, the minimum wage is ineffective or downright harmful in terms of employment growth.

However, as soon as we allow for market failures in our models, the introduction or increase of the minimum wage has the ability to improve social welfare and employment levels to a certain point. This holds true even if the employer is monopsonistic (or multiple employers form a cartel), as well as in the more plausible case where an employer hiring several employees *ceteris paribus* has to pay a higher wage than its competitor that works with fewer employees. There are models with multiple equilibria, one characterised by low wages and low performance, and another by high wages and high performance. In these scenarios, the introduction or increase of the minimum wage may push the economy over the tipping point from the former into the latter, creating a more advantageous social welfare climate. Yet other models that consider the effects of company training, friction and job search produce results that enable an increase of the minimum wage to raise employment rates within a cer-

tain interval. The models that examine factors with ripple effects prove even less conclusive than the predictions based on partial equilibrium models (for a more detailed overview see *Köllő,* 2012, *Gábor,* 2012).

Concerning the third social function, under certain circumstances in their perfect competition model *Lee and Saez* (2012) find that by way of improving the income status of some of the poor, the positive distributive impact outweighs the social harm caused by the reduction in employment that the minimum wage necessarily entails, if distributive justice has enough weight on the social agenda. The income inequality reducing impact of the minimum wage strongly depends on more than one factor: the way minimum wage rise affects income distribution through some employees losing their jobs and others starting to earn more, as well as to what extent may the concepts of "minimum wage earner", "low wage earner" and "low productivity worker" be equated.

If the actors of the economy can also adapt to the minimum wage rise by tax avoidance, the impact is going to look different. The relative cost of formal (registered) employment will increase and there is a greater motivation toward partially (grey) or fully informal employment (black market jobs). This may alleviate the potential negative employment tendencies but it simultaneously decreases the extra income that a surge in formal employment would reasonably entail. (Even if the tax avoidance tendencies of grey market workers decrease, the ratio of grey or black market workers will grow.) The subject is discussed in greater detail in *Chapter 6* of this *In Focus – I.*

If the main message of the theory proves to be: "it depends", we have to turn to empirical research. Do econometric analyses provide unequivocal replies to the question of whether the minimum wage rise grows or shrinks employment rates and income inequalities?

Lamentably, gauging the impact minimum wage has on employment is charged with statistical and methodological issues. Until the beginning of the 90s there was a collectively accepted view based on econometric analyses, stating that minimum wage rise affects employment figures negatively, the only question being its extent. However, when *Card and Kruger* (1994) published their groundbreaking study, the acceptance of the theory was replaced by animated disputes. Nonetheless, according to the overview of *Gábor* (2012), 60 to 80 per cent of current studies continue to find significant negative employment tendencies, with only 20 to 40 per cent of articles rating the impact on employment as not significant or positive.

The minimum wage rises of 2001 and 2002 provided a good opportunity for domestic empirical analyses in Hungary. The increase was substantial on an international scale: within two years, the minimum wage rate jumped from 29 per cent of the average wage to 41 per cent, surpassing even Canadian and British levels. Though the aggregated figures do not show a decline in this period of the increased labour demand, econometric studies found employment effects to be

negative, in unison with most of the international findings. *Kertesi and Köllő* (2004) demonstrated that among companies with 5–20 employees 12 thousand workers were made redundant after the first rise. *Elek et al.* (2012) analysed the impact that the increase of average wage (entailed by the minimum wage rise) had on employment up to 2003. According to their study, in the companies that were strongly affected by the rises the average wage rate grew significantly faster, while employment levels rose significantly slower (or shrunk faster).

According to Köllő's 2012 findings, minimum wage rise on a grand scale alleviated *income inequalities*, even if only short term. The Gini coefficient of gross income went back from the 0.39 pre-increase levels to 0.36 (though by 2005 it reached 0.38 again). This temporary decrease in inequality is not insignificant: it roughly corresponds to the 2005 differences between "old" and "new" EU member states.[13] The impact on *household income inequalities* was weaker, however, explained by the fact that minimum wage earners are typically not the first earners in the household. At the time of the great rises less than 20 per cent of them belonged to the lowest income quartile (*Benedek et al.* 2006, *Szabó,* 2007).

Regulating the minimum wage in Hungary

In Hungarian regulation the rate of the minimum wage is established annually, without a straightforward formula or clear criteria. It is determined by the government, with representatives of employment organisations involved to a varying degree: sometimes to a large extent, at other times merely in a consulting role (*Gábor,* 2012, *Neumann and Váradi,* 2012). Before the latest public work regulations came into effect, the minimum wage was almost universally extended to a large group of employees. Differentiating between jobseeker qualities (such as age, education, experience, ability to work etc.) has not been part of Hungarian minimum wage regulation for long. With the 2006 introduction and 2007 enforcement of guaranteed minimum income the Hungarian minimum wage regulation also introduced an (upwards) differentiation; but it was the 2012 labour code that allowed for differentiation of guaranteed minimum income levels between "certain groups of employees" (article 153 clause 2). As emphasised by *Gábor* (2012), none of the instances of the above-mentioned practice are exceptional. For all of them, we can find a varying number of European countries practicing a similar differentiation.

Arguments for the selective downward modification of the minimum wage

As demonstrated above, both Hungarian and international empirical evidence suggests that if we can identify labour market segments where the gross wage cost of the guaranteed minimum income is "too high" (compared to the average or median income, for instance), in other words, where the supposed employment reducing impact of the minimum wage is significant, the general

13 EU-15: 29.9; the 12 new member states: 33.2. (Source: *Eurostat*.)

employment situation can be improved by reducing the minimum wage levels pertaining to these groups. If the positive impact is large enough, and the social costs (of a political, budget-related, or administrative nature or originating from boosting the black economy or creating arbitrage opportunities) and side effects of downward reduction are not too significant, a modification of this kind may serve to improve social welfare even if the other two functions of the guaranteed minimum income (fairness and equity) are somewhat hurt by it.

Modifications of this kind are not a rarity in the developed world: a number of European countries apply downwardly modified minimum wage policies (see *Benedek et al.* 2006, Table 1), according to age (youth: the Netherlands, Slovakia, France, Ireland, Belgium, Great Britain), time in service (entry level jobs: Czech Republic, Poland, Cyprus), altered work capacity (Czech Republic, Slovakia) or casual worker status (Spain). These modifications typically target groups with a low average wage level, among whom the value of the (universal) minimum wage would be comparatively high. This is, in fact, the environment where the minimum wage reduction can be expected to yield significant positive employment effects.

Whether this is beneficial for the society on the whole can only be determined after carefully weighing the sum of its effects. To illustrate the considerations associated with selective differentiation, let us summarise the reasoning of a related policy proposal.

Regional minimum wage in Hungary

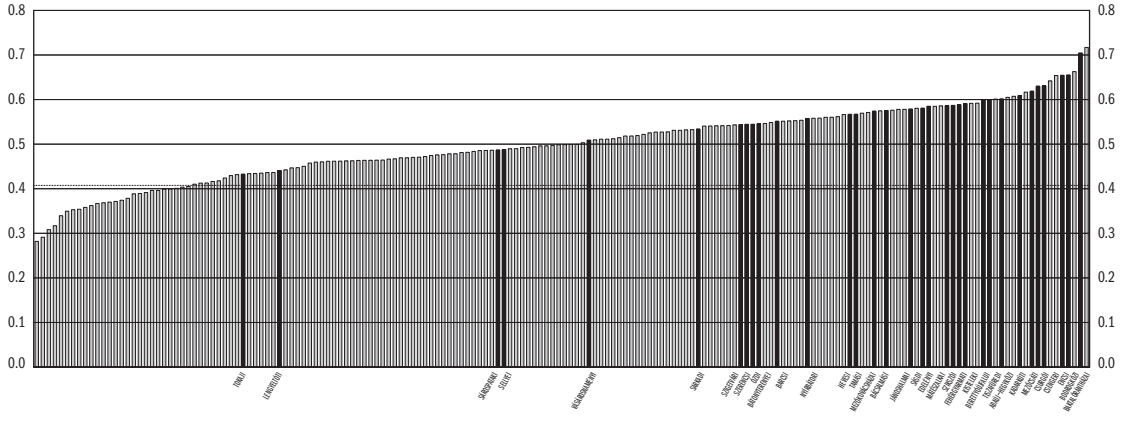
Scharle and Váradi (2009) point out that even though *Rutkowski* (2003) and *Smith* (2007) suggest its application if there is significant territorial dispersion between wages and price levels, the regional modification of the minimum wage is not common practice in Europe. However, the 2005 OECD country review of Hungary explicitly suggests its implementation (*OECD,* 2005). The recommendation is based on the idea that uniform minimum wage levels impact underdeveloped areas more strongly, for two reasons. Firstly, the price and wage levels are typically lower, therefore the countrywide minimum wage is higher both in real value and compared to the local average wage. Secondly, the proportion of unskilled workers is characteristically higher in these territories. Hence, supposing that the net employment impact of the minimum wage is greater on the unskilled than on the skilled, the underdeveloped regions are going to be affected much harder. Regional differentiation (a minimum wage rate that is lower than the national level) is suggested in the hope of counterbalancing this effect. This proposal is nuanced, but, on the whole, strengthened by the findings in *Chapter 6* of this *In Focus – I.* Benedek et al. describe the distribution of disguised minimum wage earners (arguing that there is a higher volume of this kind of tax avoidance practice in the capital, as well as among those with a higher effective income, under-represented in the regions in question). But the region-

by-region separation of actual minimum wage earners from the disguised ones would require further study, utilising the findings in the above mentioned article.

We know relatively little of the territorial differences between price levels in Hungary, though the time series of *Dusek and Szalka* (2008) largely reinforce the positive correlation between income levels and price levels; a connection that is in line with the theoretical prediction. This implies that the differences between nominal sub-region average wages overstate the difference between real wages (the problems entailed by regional price level differences and taxing nominal income were also touched upon in the introductory 1st chapter eaarlier). At the same time, considering that the territory of a median sub-region is no more than 480 square kilometers, geographic mobility and product arbitrage prevent the emergence of substantial differences in price levels between small and densely populated sub-regions.

The data in *Figure 5.4.1* suggests that a minimum wage policy that is efficient on a national level may affect underdeveloped regions more strongly. This coincides with calculations by *Kertesi and Köllő* (2004) stating that the wage shock implied by the minimum wage rises of 2001 and 2002 was largest for young persons, unskilled workers and those living in high unemployment regions.

Figure 5.4.1: Minimum wage rates in proportion to sub-region average wage rates, 2008



Note: The 33 sub-regions with the worst conditions are marked black; the dashed line denotes the national average. The weighted wage tariff data underestimate the average wage, therefore the above ratio is somewhat rounded up; however, this has little bearing on the relative situation of sub-regions.
Source: *Scharle and Váradi* (2009), Figure 2.

If we consider territorial differentiation, the first point to address is what territorial unit it should apply to. *Scharle and Váradi* (2009) suggest sub-regional differentiation since a significant part of inequalities is not reflected on a county level. Taking commuting into account, a sub-region largely corresponds to the area delineated as the local labour market. On a sub-regional level, if there

are enough competitors present, wages will level out in the short term, without movement of workforce or capital. In this milieu the political and administrative framework necessary for differentiation can also be set up.

The proposal identifies four plausible groups of criteria to establish the extent of moderation:

– indicators demonstrating the high presence of a low productivity work force especially affected by the minimum wage level (the rate of registered unemployed people and the proportion of the permanently unemployed and the young jobless; the ratio of people with altered labour capacity and the proportion of unskilled workers in the active population),
– as an indicator of the demand for unskilled labour, the proportion of the employed in the unskilled population,
– the proportion of minimum wage/average wage ratio, measuring the efficiency of the minimum wage; the so-called Kaitz index[14] that includes the proportion of those employed on minimum wage and the shock measured at the 2001 rise,
– and tax payments per capita, measuring the income status.

The various indicators highlight various sub-regions as severely disadvantaged. Structured in a table, *Scharle and Váradi* (2009) identify the few sub-regions that seem to be the most likely candidates for differentiation.

They then move on to confront the political difficulties of regional differentiation and, taking the aims and interests of the stake-holders into consideration, attempt to develop a politically viable arrangement. They thus compare three different potential solutions, presenting the advantages and disadvantages of each, as well as the foreseeable reaction of stake-holders:

– allowing for the reduction of the minimum wage by modifying the labour code, with sub-regional development councils retaining the right to establish the exact extent thereof,
– reducing the gross cost of the minimum wage by utilising EU development funds, inspired by the example of the *Start* card for entry level employees,
– reducing the gross cost of the minimum wage by relief from social security contributions, employing budget resources.

Finally, through an international comparison they conduct calculations on the desirable extent of differentiation. They also suggest rules aimed at decreasing the risk of arbitrage and, inasmuch as possible, present the budget and employment related impact of a few imaginable scenarios. According to their calculations based on earlier empirical estimations, in these sub-regions a 30 per cent decrease of the minimum wage could boost unskilled employment levels by 6–12 per cent within 2 or 3 years. The developments of the past two years, especially the strengthening of the administrative role of the district, and the proposed amendment to the labour code make even the first version of the proposal (which seemed somewhat far-fetched in 2009) feasible.

14 The Katz index is the ratio of the minimum wage and the average wage, multiplied by the number of people employed on minimum wage.

5.5 A review of the international literature on the differing effects of employer versus employee contributions

ÁRPÁD FÖLDESSY

In the classic model of economics, the labour market effects of taxing employers and employees are equivalent (this is the so called tax liability side equivalence, or LSE): the economic burden does not depend on whom the tax was levied on in the legal sense (*Musgrave,* 1959; *Stiglitz,* 1988; *Fullerton and Metcalf,* 2003). This is corroborated by empirical analyses as well, such as *Tyrväinen* (1994) or *Robertson and Symons* (1990), who show that such differences in the types of taxes have no effect on the fluctuation of wage costs or unemployment in OECD countries. This stems from the classic model, in which labour supply is determined by the net wage and labour demand by the total wage cost, and their equilibrium depends on the difference of these two (and the sum of taxes). Therefore, the share of employee and employer contributions within total taxes is of no consequence.

However, in most countries, the allocation of social security contributions between employees and employers is the subject of lively debates among politicians and the general public as well (*Borck et al.* 2002; *Ruffle,* 2001). To account for this interest, the economic literature has turned to examining the assumptions behind the equivalence theorem. The first of these is the perfectly competitive labour market, in which gross wages freely adjust to changes in the tax system. This assumption may not hold if the minimum wage is close to the equilibrium wage, unions are strong (*Riedl and Tyran,* 2003), taxation is progressive (*Lockwood and Manning,* 1993, *Holm et al.* 1995, *Rasmussen,* 1997, 1998, *Andersen and Rasmussen,* 1999), or if the unemployment benefit is tied to gross wages (*Picard and Toulemonde,* 2001). The latter situation arises when the unemployment benefit is indexed to the market wage but is non-taxable, which is quite common in OECD countries.

In the absence of such external constraints, wage adjustment may still be imperfect if for example workers resist nominal cuts in the net wage, which leads to wage rigidity. In this case, real wages can only adjust to the new equilibrium level with an increase in the level of prices, which definitely disproves the equivalence principle in the short run. While *Bewley* (1999) names efficiency wages as the primary cause of endogenous wage rigidity, *Pisauro* (1991) shows that the equivalence is also valid in these labour markets, as long as agents base their decisions on the net wage. However, as *Riedl and Tyran* (2003) point out, in an efficiency wage world it is unlikely that decisions are solely based on the net wage. This hypothesis relies on the results of *Kerschbamer and Kirchsteiger* (1999), who conduct a laboratory experiment and find that the tax burden tends to be larger for the party which is legally obligated to pay it. As the first step toward disproving the equivalence principle

the authors test the rationality condition, and after finding that it holds for a convincing share of participants, they relax the assumption that individuals only want to maximize their after-tax earnings. They conclude that labour market decisions are in fact influenced by certain social norms of work and material well-being as well as net wages, which suggests that the validity of the equivalency principle is limited.

Riedl and Tyran (2003) focus on the social norm of gift-exchange, the essential mechanism behind efficiency wages (*Campbell and Kamlani,* 1997). In theory, employers offer their workers higher wages than the market equilibrium level as a quasi-gift, hoping for a level of effort higher than that which can be enforced by supervision. This partly goes beyond the assumption of a perfectly rational and utility-maximizing worker, but is considered quite realistic in view of the existing social norms. However, *Akerlof* (1982) shows that the equivalence is valid in the case of gift-exchange as well: according to his hypothesis, labour markets of this type enable workers to regard taxes independently from the relationship to their employers, and thus base their decisions on the level of gross wages.

The wage paid by the employer is of particular importance in exchange-based labour markets: as long as it is observable by the employer, it indicates the generosity of the employer's gift and through this determines the level of effort to be made in return. However, according to the hypothesis, the wage paid by the employer will depend on the legal incidence of the tax: they pay the gross wage if the tax is levied on employees and the net wage if it is levied on employers.

In accordance with this theory, if the burden of contributions and taxes is levied on workers, the wage which they can observe and use as an indicator for employer recognition will be the gross wage, and will choose their effort level accordingly. If, however, taxes and contributions are levied on the employer, the observable wage will be the net wage. Therefore, such a tax system – since workers observe the net wage, rather than the gross wage – causes a decrease in the perceived generosity of employers and thus in worker effort as well.

In such a case, employers, who are concerned with employee satisfaction (and effort), will be interested in raising the net wage. By contrast, if the tax burden is shifted from employers onto workers, the gross wage will become the observed wage which is high enough for the employer to attempt a cut (reducing the net wage as well). Thus, in an efficiency wage world, the incidence of taxes has an opposing effect on net wages, which disproves the tax liability side equivalence principle.

Riedl and Tyran (2003) test the above hypothesis on Dutch college students using behavioural experiments. Their results indicate that the presence of equivalence can be proved in the short run as well. Their results hold for markets which are independent from each other and have different tax systems, and also for a change in the tax systems implemented on the same market. The in-

cidence of taxes has no significant effect either on worker effort or on the income distribution between employers and workers.

The external validity of the experiment is restricted by a number of factors, such as the fact that in the experiment by *Renner and Tyran* (2003) the labour market has fairly large excess supply (40 per cent). Furthermore, disregarding long-term contracts between workers and employers could have affected the results: these are proven to increase wage rigidity on markets where the employer is not perfectly aware of worker productivity. The experiment also disregards the fact that the lack of information and awareness on the tax system by workers can strongly influence their perception of wages. While well-informed workers may tolerate a cut in net wages following a tax burden shift to the employers' side, that may be harder to accept for those who have no exact information regarding it. Finally, being well informed or not about taxes may vary across the different types of tax. For instance, successful communication by the government can raise tolerance and awareness toward new taxes, while other types of taxes excluded from this may escape workers' attention (*Sausgruber and Tyran,* 2005).

Gourke (2000) points out the importance of social security contributions, which are – in contrast to the income tax – independent of the taxpayer's source of earnings. While according to the equivalence principle, a change in gross wages compensates workers in the event of a shift in the legal obligation for paying income taxes from employers to workers, this cannot be achieved in full in the case of a similar shift in social security contributions. This is because the income tax is borne exclusively by those employed, but social security contributions also apply to jobseekers and the inactive population. The latter two groups have no employer to compensate them for the shift, which will therefore affect their net income – for jobseekers this equals the unemployment benefit minus social security contributions. Thus, regarded in a broader sense, the shift changes the relative level of labour income as opposed to non-labour incomes, which has an unavoidable effect on labour supply.

All in all, it is fair to say that the equivalence principle regarding worker and employer taxes has been empirically verified by the literature. However, the validity of some of the assumptions behind the principle may be questioned under certain conditions, such as a binding minimum wage, strong union activity, a progressive tax system (*Lockwood and Manning,* 1993; *Holm et al.* 1995; *Rasmussen,* 1997, 1998; *Andersen and Rasmussen,* 1999), taxable unemployment benefits (*Goerke,* 2000) or unemployment benefits tied to the gross wage (*Picard and Toulemonde,* 2001). One or another of these conditions applies in almost every OECD-country, and thus in Hungary as well.

Finally, let us return to the role of social norms which are potentially important determinants of worker behaviour beside net wages. Even though analysing these with the tools of economic analysis is dubious, *Kerschbamer and*

Kirchsteiger (1999) present convincing evidence of their effects. By contrast *Riedl and Tyran* (2003) show that there are norms (namely gift-exchange and efficiency wages) that do not alter the equivalence of the effects of worker and employer taxes.

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6. TAX AVOIDANCE, TAX EVASION, BLACK AND GREY EMPLOYMENT

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Introduction

There are various forms of tax avoidance and tax evasion related to the labour market. While some of the workers are employed lawfully and pay taxes and contributions on their wages (declared work); others, although registered receive part of their pay as envelope wages without paying taxes, or may reduce their tax liability using other – unlawful – means (for example sham contracts). A third group of workers might not even be registered (black work/undeclared work). Black and grey work are against the law and thus fall into the category of *tax evasion*, while within "white" (lawful) employment it is possible to identify groups (e.g. of entrepreneurs) that use *tax avoidance* methods that are legal in order to reduce their tax liability.

It is not accidental that black and grey work and legal tax avoidance are at the centre of economic policy debates in Hungary. Their prevalence has major implications for the aggregate economic effects of minimum wage increases, tax cuts to low skilled workers or other economic policy measures. This chapter provides an overview of empirical results – mainly using existing studies – concerning tax evasion and the labour market to help attain a clearer understanding. Following a brief theoretical introduction, it presents empirical findings from international studies on the prevalence of the shadow economy and undeclared work and then moves on to explore black and grey work, as well as tax evasion among entrepreneurs in Hungary, using detailed, micro level data. Finally, the last sub-chapter considers the income redistribution effects of tax evasion, still using micro-level data. The economic policy implications of the findings are also discussed at various points.

Factors that determine tax evasion

According to the traditional economic approach (see for example *Slemrod and Yitzhaki,* 2002) economic actors make decisions about tax evasion by comparing the potential costs and benefits – or differently the payable fine and the amount of tax that can be evaded.[1] Therefore, higher fines and increased (or better targeted) inspection will definitely reduce tax evasion whereas the effect of tax rates in the theoretical models is unclear as they influence both potential benefits and costs. However, it is difficult to explain the willingness to pay taxes using the standard model – considering the limited risk of being caught and the rates of potential fines –, therefore the more recent literature on be-

1 The expected value of the loss is equal to the sum of the fine and the tax liability multiplied by the probability of being caught.

havioural economics incorporates the effect of the social environment, such as respect for rules and the need for belonging to groups.[2]

Another strand of the theoretical literature considers the distorting effects of tax evasion. In this approach, tax evasion reduces effective tax rates in a predictable way, therefore the main negative consequence of tax evasion is not the loss of tax revenue but the fact that it has a differential impact on different sectors. Therefore it distorts economic activity and also leads to an unintended re-distribution of income between economic actors.

Coming to empirical findings, the international literature identifies various factors associated with tax evasion, including black and grey work. Various studies, using macro-level data (see for example *Christie and Holzner,* 2006), showed a positive association between the tax burden and the extent of tax evasion. Using micro-level data from Quebec *Lemieux et al.* (1994) showed that the tax burden influenced the decision between white and black work. In his analysis of the flat-rate tax reform in Russia, *Slonimczyk* (2012) found that informal employment declined among employees who experienced a decline in their tax rates. Various empirical studies looked at the impact of the tax burden on declared income, although there were mixed findings on what might have caused changes in reported income: tax evasion (i.e. grey work), tax optimisation (for example turning labour income into capital income) or changes in labour supply. This debate is presented in detail in *Chapter 2* of *In Focus –I*; however generally it can be assumed that both channels have a role in adjustment (see for example the review by *Saez et al.* (2012) or the article by *Gorodnichenko et al.* (2009) on tax reform in Russia). In addition to taxes, factors considered to influence black and grey work include over-regulation of labour and product markets, the administrative burden of businesses, loss of eligibility for welfare provisions when taking up declared work, and laxity of tax inspection (see for example *Koettl and Weber,* 2012).

Estimating the prevalence of the shadow economy using aggregate data

The shadow economy can be measured using direct and indirect methods. Direct methods use secondary analysis of population and business surveys and (micro-level) administrative data, for example calculating the extent of the shadow economy based on the amount of tax arrears uncovered by the tax authority's investigations. Indirect methods estimate *total* economic activity and income using a range of related *proxy* variables, and compare them with *reported* economic performance and income. The comparison can be made at the micro level – for example using household survey data on consumption and food consumption as proxies for actual income, such as in *Pissarides and Weber* (1989); or at the macro level – for example estimating total economic ac-

2 For a summary of the theoretical literature on tax avoidance and tax evasion in Hungarian see for example *Scharle et al.* (2010).

tivity based on cash flow or energy consumption, see for example *Lackó* (1998). The advantage of macro-level approaches is that they need less data, while the advantage of micro level ones is that they provide information about the distribution of hidden activities. *Schneider* (2004) provides a detailed description of these methods.

The majority of international comparative studies suggest that the share of the shadow economy is higher in Hungary than in Western Europe, however lower than in some Eastern European countries. According to *Schneider's* (2004; 2012) indirect estimates using macro-level data, the shadow economy made up 24–26% of the GDP in Hungary between 1999 and 2007. This was similar to Poland, however significantly higher than in the Czech Republic and Slovakia (17–19%), or Austria and Germany (10–16%), but lower than the estimated 30–34% for Romania. *Elek et al.* (2009b, Table 1) reported various figures concerning the shadow economy in Hungary.

Some international comparative studies assess the loss of tax revenue due to the shadow economy comparing "theoretical" tax revenue, estimated using income and consumption data from national accounts and tax regulations, with actual revenue from taxes. *Christie and Holzner's* (2006) rough estimates suggested that 46% of consumption was hidden from VAT payment, and 30% of the personal income tax base as well as 36% of social insurance contributions were hidden in Hungary. However, this calculation did not take into account the overall complexity of the tax system and the presence of tax allowances, therefore the figures should be considered upper estimates – nevertheless they might still be suitable for international comparison. This comparison also suggested that tax evasion was higher in Hungary than in Western Europe and its magnitude was similar to that in other Visegrád countries. A more exact estimate of the evasion of main taxes in Hungary was provided by *Krekó and P. Kiss* (2008) who argued that the evaded part of the VAT base was 12–14% of GDP in 2005, equivalent to 23–27% of household consumption (the VAT base) and thus considerably lower than *Christie and Holzner*'s (2006) estimates. According to *Krekó* and *P. Kiss* the hidden VAT was around 2% of GDP; while the total quantified tax evasion – including tax evasion by employees and the self-employed – came to around 7–8% of GDP.

International estimates of shadow employment

With regards to labour-market related forms of tax evasion, cross-country comparisons in the international comparative literature cannot always fully consider all dimensions of shadow employment (grey and black work); therefore they use more easily measurable proxies. Hence entrepreneurs without employees, unpaid family workers, employees without a written employment contract or (as a broader category) workers employed by micro businesses (less than five employees) are often considered informally employed workers. The different

proxy categories provide different estimates for informal employment. Considering the three most frequently analysed categories, six per cent of the non-agricultural workforce were entrepreneurs with no employees and 2.6% were employed without a written employment contract in Hungary in 2006–2007 (the latter nearly halved since 2002), while approximately 2% of the workforce had more than one job. These figures, with some exceptions, are broadly similar to those of other Visegrád countries – however the share of those without an employment contract and of entrepreneurs are considerably lower than in the less developed OECD countries, such as Mexico and Turkey.[3]

According to the Eurobarometer Survey of the European Commission in 2007, seven per cent of the Hungarian sample responded that they had done undeclared work in the previous 12 months and eight per cent of those in employment said that they regularly received all or part of their pay as an envelope wage. Thus, data suggest that both black and grey work is more widespread in Hungary than the EU average (five per cent for both). Interpretation is made more difficult by the fact that the highest rate of undeclared work was recorded in Denmark (18%) while Southern European countries reported very low rates (one to four per cent in Cyprus, Malta, Italy, Spain and Greece), which seems to contradict information from other sources. This suggests that cross-country differences in black and grey work are very difficult to measure reliably with survey methods due to differences in the willingness to respond and in the interpretation of questions.

The remainder of this chapter explores wage-related tax evasion in Hungary using a secondary analysis of micro-level (administrative and population survey) data that were mainly collected for other purposes. This approach minimises the underreporting bias of surveys specifically designed to measure tax evasion, however it still has the advantage of micro-level analysis which permits the disaggregated analysis of tax evasion. These studies typically use data until 2007 or even earlier, therefore *Box 6.1* at the end of this chapter analyses changes in the prevalence of envelope wages in the past four years using population surveys from 2008 and 2012.

Measuring undeclared work using administrative data

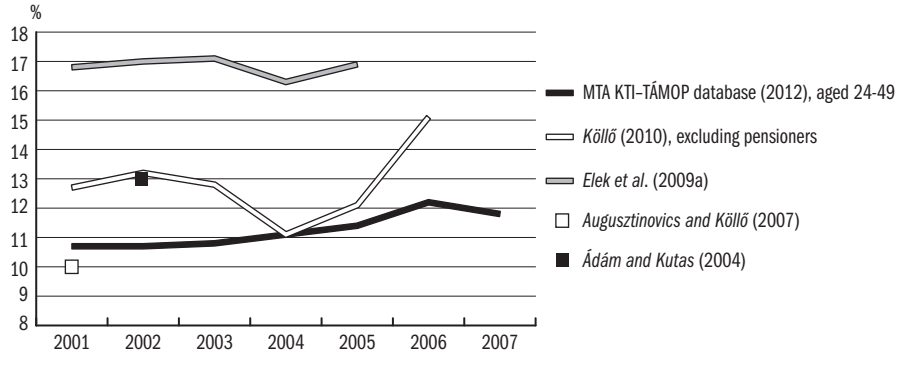
Within undeclared work, the share of those workers can be estimated who have not been declared to the authorities by their employers but in different surveys respond that they are working. For the comparison, the number of declared workers (i.e. whose employers pay the employment-related contributions) can be calculated using individual-level administrative data from the Central Administration of National Pension Insurance (in Hungarian: Országos Nyugdíjbiztosítási Főigazgatóság, ONYF) and the National Tax and Customs Administration (in Hungarian: Nemzeti Adó- és Vámhivatal, NAV, previously APEH); total employment is taken from the KSH's Labour Force

3 Source of data: *OECD* (2008). The computations are based on European Social Survey, European Labour Force Survey and OECD Labour Force Statistics databases.

Survey (LFS).[4] The validity of the comparative (discrepancy) method depends on whether the majority of undeclared workers report their work in the LFS. Indirectly this is suggested by the fact that the LFS recorded the highest level of employment compared to other surveys (Population Census, KSH Time Use Survey, Tárki Monitor) in 2001 (*Elek et al.* 2009b).

Recently various studies estimated the level of undeclared employment in LFS data using the comparative method *(Figure 6.1).*

Figure 6.1: Estimates of undeclared employment in the LFS, 2001–2007 (percentage)



Source: From referenced studies.

Results are slightly different depending on the methods and the sub-samples used, but they always fall into the range of between 10–17 per cent and do not seem to indicate major changes in 2001–2007. (This is the case despite the fact that the minimum wage increased considerably in 2002 which, according to the theoretical models, would have implied an increase in undeclared work.) *Ádám and Kutas* (2004) compared LFS data with tax return data from NAV. *Elek et al.* (2009a) modelled the LFS definition of employment on a database of 200,000 contribution payers from the ONYF and used the start and end date of insurance periods to adjust for any gaps in contribution payment (i.e. for fragmented employment).[5] With a slightly different approach, *Augusztinovics and Köllő* (2007) used the insurance qualifying time from the ONYF database to correct fragmented employment, focusing on the non-retired population. Finally, the Social Renewal Operational Programme (in Hungarian: TÁMOP) 2.3.2-09 coordinated by the Institute of Economics of the Hungaran Academy of Sciences (MTA KTI, the predecessor of the Research Centre for Economic and Regional Studies, in Hungarian: Közgazdaság- és Regionális Tudományi Kutatóközpont, KRTK) used a much larger sample of panel data – administrative data from half of the population – however its estimates refer only to the 25–49 year old population and indicate relatively low undeclared work levels (See Annex on pre-publication data.)

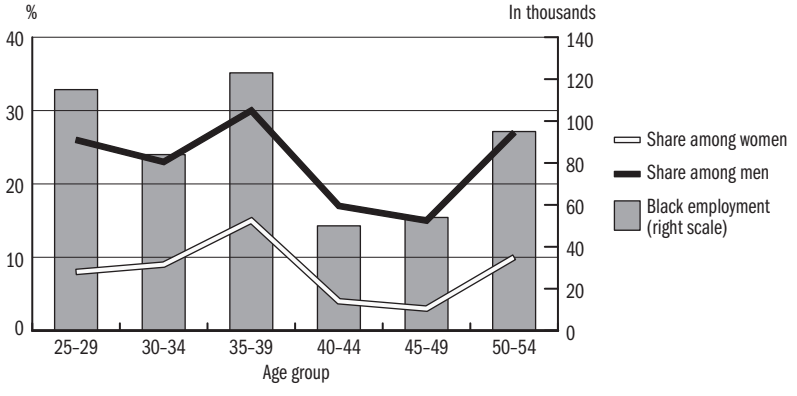
4 The Labour Force Survey defines people in employment as those who did at least one hour's paid work in the reference week or did not do any paid work but had a job and were temporarily away.

5 For the exact matching of the Labour Force Survey's and ONYF's definition of employment see the Appendix of *Elek et al.* (2009a).

These results are consistent with estimates from surveys: the prevalence of undeclared work was estimated at 15% by *Semjén et al.* (2009b), while *Czibik and Medgyesi* (2007) estimated approximately 10%. *Köllő* (2010) used a joint KSH–ONYF survey (see *Bálint et al.* 2010) to estimate black employment among those who worked in the same job according to the LFS from a given year until 2008. Completely undeclared work (no qualifying service for pension during the year) even in this relatively stable group of workers reached on average 8.4% each year between 1999 and 2006.[6]

Using micro-level databases it is possible to analyse undeclared work based on gender, age, place of residence and occupation. First, it can be concluded that undeclared work is substantially less common among employees than entrepreneurs. For example the number of entrepreneurs was estimated at 527,000 based on the LFS as opposed to 302,000 according to ONYF in 2004 (*Elek et al.* 2009a). Undeclared employment is significantly more common among men than women, and in terms of age, it is most prevalent in the 25–39 age group. Overall, nearly half of the undeclared workers are in the 25–39 age group (see *Figure 6.2*).

Figure 6.2: The number and percentage of undeclared workers in the total workforce by age group and gender in the LFS and ONYF samples, 2004



Note: Considering that pensioners in employment were not required to pay pension contribution in 2004 and employment in the 15–24 age group was very low, data is only presented for the 25–54 age group. According to calculations based on the MTA KTI–TÁMOP database (see Annex of this chapter) in 2007, when pension contribution had to be paid, undeclared employment was about five per cent – well below average – among the 50–74 year olds.
Source: *Elek et al.* (2009a).

The prevalence of undeclared work is highest in the central parts of the country and it is above average on the Great Plain. However, the regional estimates might be biased because ONYF records the permanent address while LFS uses the place of actual residence; therefore some of the workforce moving into regions with more job opportunities might not appear there as a regis-

6 The results might be biased by the fact that those people who were the most motivated to participate in the joint KSH–ONYF survey were those who suspected that they were not declared by their employers to the relevant authorities. This bias could be partly adjusted by applying weighting based on observable characteristics.

tered employee. However, other data suggest that migration is low so this bias is probably not substantial. The findings of these studies are consistent with the results of a survey reported by *Sik and Tóth* (1998) in that undeclared work was least prevalent in Transdanubia, particularly the Central-Transdanubia region. The estimates according to occupational groups are very sensitive to the accuracy of categorisation, therefore only some unequivocal results are highlighted here: undeclared work is prevalent and common among workers in building construction, drivers, machine operators, technicians and people in personal services. Above average prevalence is found among security guards, architects, secondary school and university graduate IT workers, university graduate cultural occupations and in repair and maintenance. There is no, or very limited, undeclared employment among secondary school and university graduate employees in health and human services (working mostly in the public sector), university graduates in general (except architects and cultural occupations), in catering and in elementary occupations (except agricultural workers).[7] Undeclared employment is below average in the retail sector and in light industry as well.

The database used by *Köllő* (2010) is the only database that combines LFS and ONYF data for the same individuals, therefore the probability of reporting can also be analysed using multivariate estimation. The study included individuals who said that they had been working in the same job without interruption and looked at the actual ratio of these that appeared in the ONYF register as opposed to the expected 100 per cent. The coefficients of variables explaining the percentage of reporting indicated below-average ratios where higher levels of undeclared employment would have been expected based on the findings of other studies and everyday experience (small enterprises, self-employed, casual workers, new entrants and those near pension age, people in atypical employment, male, Budapest, areas affected by high unemployment). The controlled (multivariate) estimation showed that reporting was lowest among people with a non-vocational secondary education. The ratio of reported qualifying time was somewhat, although not significantly, higher among those with a primary education or below, while among those with a secondary vocational qualification the data show that the ratio was around 3–4% higher (compared to those with a non-vocational secondary education). College graduates reported more working days by four percentage points, while university graduates by eight percentage points than comparable people with a non-vocational secondary education.

Measuring grey work

Underreporting of wages is prevalent in some sectors even in Scandinavian countries, often cited as examples of a high level of tax compliance.[8] It is particularly common that entrepreneurs pay the compulsory minimum wage.

7 These findings do not exclude the possibility that the prevalence of undeclared employment is high among the self-employed in these occupations.

8 Based on inspections carried out in 678 pizza restaurants, the Danish tax authority found that wages were under-reported for 40% of the workers. The majority of the others were completely undeclared. One third had their "first day at work" at the given workplace (*Kolm and Nielsen,* 2008).

This "disguised minimum wage" is especially common in countries on the European periphery, and it was also widespread in Hungary until recently. Softer and harder facts on this were reported by the *World Bank* (2005) for multiple countries, *Erdogdu* (2009) for Turkey, and *Kriz* et al. (2007), *Masso and Krillo* (2009) and *Meriküll and Staehr* (2010) for the Baltic States. In various countries, such as Latvia, Lithuania, Hungary and Romania, the number of people who are paid the minimum wage is (or was a few years ago) suspiciously high, despite the minimum wage – average wage ratio being near the international average (*World Bank,* 2005). Although there might be various reasons for the high number of people earning around the minimum wage, tax evasion is certainly one of them (for alternative arguments see for example *Shelkova,* 2008 or *DiNardo et al.* 2005). In an international comparison, *Tonin* (2011) found a strong relationship between the rate of people who are paid the minimum wage and the estimated size of the black economy.

Hungarian studies so far – except for *Elek et al.* (2009b) – were based on the assumption that fraudulent employers register their workers at the minimum wage to minimise their tax liabilities, however workers are also paid envelope wages. This assumption is strong far from obvious. Even if it is true that entrepreneurs maximise their profit in the short run if they pay the national minimum wage, in the long run this strategy has costs as well: on the one hand it might trigger the protest and exit of workers, and on the other hand it might increase the probability of being caught if the tax authorities are suspicious of companies paying the minimum wage. "Registering workers at the minimum wage" becomes the dominant form of underreporting wages if workers have limited bargaining power and/or see no strong relationship between contribution payment and future eligibility for transfers (pension, unemployment and health care), moreover the tax authorities do not consider minimum wage as a signal of tax fraud.

Incentives and permissive conditions for "registration at minimum wage" were undeniably present in Hungary before 2007. Due to high contributions the potential gain from underreporting wages was high and has remained high. As is highlighted by *Tóth and Semjén* (2009) the majority of those who are paid the disguised minimum wage accept underreporting out of necessity. The relationship between contributions and benefits is loose and the probability of being caught only increased in 2007 when – following the examples of Bulgaria (2003) and Croatia (2003) – a contribution base equal to twice the minimum wage was introduced. This made it clear that policy makers considered the payment of minimum wage as a "signal of tax fraud". This measure reduced the number of people paid the minimum wage by 60% in a single year; however this does not mean that underreporting of wages became less prevalent, but the optimum method of hiding the tax base changed.

Research in Hungary started relatively late in 2007 and estimates of the prevalence of underreporting of wages are rather uncertain and spread across a wide range depending on the methods and assumptions applied.

The *existence* of underreporting of wages was studied using indirect methods by *Tonin* (2011), and *Benedek et al.* (2006). Tonin found that food consumption declined more in poor households where one or more family members earned the minimum wage than in similarly poor, but non-minimum wage earning households after the increases of the minimum wage in 2001–2002. Thus, he concluded that the typical worker earning the minimum wage receives some of his pay as an envelope wage (for more details see *Box 6.2*). On the contrary, *Benedek et al*. found that the average person earning the minimum wage does not consume more compared to their income than a similar worker who earns more than the minimum wage.

The number of workers earning the minimum wage

Attempts to estimate the *magnitude* of underreporting face difficulties from the outset because it is difficult to establish how many people are earning the minimum wage. Payroll statistics are only available for companies of five or more workers, while the general assumption is that the majority of workers earning the minimum wage are employed by companies with 0–4 employees. One of the first attempts to establish the number of people earning the minimum wage was by *Krekó and P. Kiss* (2007, 2008); in a period when some of the data necessary for reliable estimates was not available. They started out from the observation that 30% of tax payers reported an annual income of less than twelve times the monthly minimum wage in 2005. After adjusting these figures using data on daily working time and assumptions on annual working time, they concluded that 700–750 thousand people were paid no more than the minimum wage in 2005, approximately equivalent to 25–27% of the workforce at that time. Later, more accurate estimates could be made using ONYF's data on contribution payments (the KELEN database) because these provide more accurate information on the length of contribution payments within the year[9] and also allow a distinction between wages and income-dependent transfers that appear in personal income tax returns as labour income such as unemployment allowance, child care allowance and sick pay.

Estimates based on ONYF data suggest that a smaller rate of workers were paid the minimum wage. Using data from 2004 *Elek et al.* (2009b) estimated the number of workers earning the minimum wage at or below 472,000 people (17%). They also concluded that only 40% of those with an annual "labour income" less than twelve times the monthly minimum wage were actually paid less than the minimum wage per month. The majority did not reach this level because they were not working throughout the whole year.

9 The duration of employment in one year can only be estimated from personal income tax returns – based on information on tax credits.

Even more accurate calculations can be done using the very large 50% sample of the MTA KTI–TÁMOP database (for details on the database see the Annex of the Chapter). According to this data set, 21.3% earned no more than twelve times the monthly minimum wage annually in 2005. However, if only the income of employees and public sector workers is considered (and the income of entrepreneurs and transfers are disregarded) then the annual rate drops to 15% while the rate of those whose average daily earning falls below the daily minimum wage amounts to only 10.2%. This rate is only slightly higher than the 9.6% reported in the Wage Survey (in Hungarian: Bértarifa-felvétel) based on the monthly pay of workers in companies with five or more employees and public sector workers.[10]

Finally, the April – June wave of the KSH's Labour Force Survey in 2001 provided useful information, since it also covered earnings as a special feature. The survey identified 486,000 employees whose monthly pay was not higher than the minimum wage; this corresponded to 17.7%.[11]

Based on the above calculations it might be concluded that the total number of people who were paid the minimum wage or less was between 300 and 500 thousand during the peak of the mid-2000s; well below the 1–1.5 million figure suggested by the media.[12] The question is, how many of these were committing tax fraud?

The number of disguised minimum wage earners

Krekó and P. Kiss (2007) estimated the number of disguised minimum wage earners based on the assumption that wages and the rate of part-time workers were the same in companies with 0–4 workers and in larger companies. They found that companies employed more than 450,000 people fraudulently at the minimum wage in 2005, somewhat more than 15% of the total workforce. The rate of fraudsters was estimated at 70% in small companies. Furthermore, it was estimated that for more than 300,000 part-time workers employers reported shorter working time than the actual number of hours worked.

Elek et al. (2009b, 2012) used the *double hurdle* econometric model to estimate the probability of fraud in 2003 and 2006 data.[13] The model starts from the assumption that the (latent) true wage can only be observed if two conditions are met simultaneously: the individual's productivity is above the minimum wage level *and* is not underreporting. In all other cases the minimum wage is observed instead of the true wage. If model variables can capture the variance in productivity and fraud, then the probability of fraud and the true earnings of individuals can be estimated. Both estimations were based on data from the Wage Survey for companies with five or more employees, where payments *under* the minimum wage were practically non-existent. Thus the aim was to identify envelope wages for those who were paid in a narrow range around the minimum wage.

10 Using the original weightings of the Wage Survey provided by the National Labour Office, this rate is 7.6%. The above figure is obtained using the correction weights computed by the IE HAS Databank that also take into account that the response rate among small businesses is below average. It should be noted that six per cent of the 2005 Wage Tariff Survey's sample worked in companies with 0–4 employees.

11 For this computation we converted the net monthly wage into the gross monthly wage using the tax table and then calculated full-time monthly equivalent earnings based on the number of working hours paid. This value was then compared to the minimum wage which was, at that time, 40,000 forints.

12 Google returns 1,502 search results for the term "one million minimum wage earners" (*in Hungarian: "egymillió minimálbéres"*).

13 The model was first used by *Cragg* (1971) to model the consumption of durable goods. Since then the model and its extensions have been used by numerous studies, however we are not aware of many applications in the field of wage distributions (but see *Shelkova,* 2008 and *Di Porto,* 2011).

Elek et al. (2009b, 2012) estimated the rate of disguised minimum wage earners in the private sector using the above method at 7–11% in 2003 and 5.5–6% in 2006. They found that approximately 40–50 of those earning the minimum wage received envelope wages as well in the two years (however, the estimate is rather sensitive to the assumptions on the wage distribution).[14] The estimated true wage of fraudsters was significantly above the minimum wage (by about 2–2.4 times in the two years), which follows from the fact that the probability of fraud is highest among high-skilled minimum wage earners.

Estimates also show that disguised minimum wages are more common than the average in free-lance or retail type occupations that are characterised by frequent cash transactions.[15] This is not surprising since the presence of costumers using cash provides more opportunities for tax fraud. While underreporting was estimated to be 15% among cleaners, in the construction industry it was 50–60%, and nearly 100% among managers and university graduates. The share of disguised minimum wage earners in the total workforce is highest in the construction and retail sectors.[16] The probability of underreporting is negatively associated with the size of the company; furthermore it is low in foreign-owned companies (*Tóth and Semjén* (1996) and *Semjén and Tóth* (2004) reported similar findings). The probability of underreporting is higher in Budapest and in villages compared to towns; which is consistent with the findings reported by *Semjén et al.* (2009b) for example. The presence of tourism increases, while the density of enterprises decreases the probability of tax fraud.

Not only is the probability of fraud higher among more educated minimum wage earners with better earnings potential – this is expected –, but also they are responsible for a disproportionately large part of the contribution and tax base hidden as a result of underreporting wages. This is not addressed explicitly in the above studies; therefore it is discussed here using 2006 data from the paper by *Elek et al.* (2012), see *Table 6.1.*

Table 6.1: "Disguised" minimum wage earners in the quintiles of the estimated true wage, 2006

	Quintiles of the estimated true wage					Total
	bottom	2nd	3rd	4th	top	
Minimum wage earners (percentage)	41.6	8.0	8.0	7.9	6.4	14.8
Probability of fraud among minimum wage earners (percentage)	33.4	54.2	61.5	70.6	84.9	47.5
Fraudulent minimum wage earners in the group (percentage)	13.9	4.3	4.9	5.6	5.4	7.0
Excess of the simulated real wage above the minimum wage (thousand forints)	3.6	22.3	54.1	106.1	285.7	95.1
The distribution of hidden wages (percentage)	2.0	3.8	10.4	23.1	60.7	100.0

Source: Own calculations based on results reported by *Elek et al.* (2012).

14 *Elek et al.* (2009b) estimated the proportion of disguised minimum wage earners at 40–65% of all minimum wage earners in 2003; the lower end indicates a scenario when tax evasion only happens among minimum wage earners. (Allowing tax evasion above the minimum wage changes both the true wage distribution and the number of disguised minimum wage earners.) *Elek et al.* (2012) estimated the proportion of disguised minimum wage earners at around 50% for 2006.

15 For the definition of categories see *Köllő* (2008), *Appendix 4.*

16 It should be noted that these results include only employees and not the self-employed.

For *Table 6.1* business sector employees observed in the Wage Survey were ranked into quintiles (one-fifths of equal number) based on their estimated true wage; for non-fraudsters this was equivalent to the actual wage and for fraudsters to the predicted true wage. The table shows that the probability of fraud among minimum wage earners in the bottom quintile was 33%, while it was 85% among the potentially highest earners. Although the number of disguised minimum wage earners declines, the excess of the true wage above the minimum wage increases sharply towards the high end of the (true) income distribution. Based on this information it is possible to calculate how the amount hidden from taxation is distributed between quintiles of workers: over half of it goes to the quintile with the highest (true) pay.[17] The policy implications of this will be discussed later.

It should be noted that the above calculation ignores the underreporting of working time as a form of evading the minimum wage (*Krekó and P. Kiss,* 2007; *Elek et al,* 2009b; *Semjén et al.* 2009b), which frequently occurs in the lower segments of the market and somewhat mitigates the inequalities reported in the table. *Box 6.3* examines whether the introduction of the stamp book for casual workers (in Hungarian: alkalmi munkavállalói könyv) reduced the extent of the black economy – through the registration of previously undeclared workers, or boosted it – by switching regular employment into casual work.

Policy implications

What is the effect of the fight against the underreporting of wages on the labour market? *Kolm and Nielsen* (2008) examined this question using a partial equilibrium framework, thus ignoring the impact on investment and budget. According to their model stricter inspection increases unemployment through an increase of production costs (that is equivalent to the increase of effective tax rates). Higher labour taxation, somewhat surprisingly, reduces unemployment: the return on underreporting is higher if tax rates are higher, therefore increased labour supply puts a downward pressure on wages and makes it possible to expand demand as well as employment.

Obviously, the underreporting of wages also influences the labour market via reducing budget revenues, particularly in countries characterised by high state intervention and where the tax burden on legal employment is high. What is the impact of underreporting on the budget? *Köllő* (2008) deliberately attempted to give an exaggerated *upper bound estimate* for hidden wages and foregone tax revenues. He attempted to estimate the increase in the tax base and revenues based on the following assumptions: a) all minimum wage earners are fraudsters, b) all workers currently receiving the minimum wage would be paid the same as what workers with a similar education and experience are getting who are not paid at the minimum wage level, c) labour demand is insensitive to wages, and d) underreporting can be eliminated at zero cost. Under these admittedly

17 Given that the groups are of equal size, the total amount of hidden income is the sum of the product of the numbers in the third and fourth rows.

unrealistic conditions, social security contributions would go up by 8.5% and income tax revenues by 9.7%. This would mean an additional revenue equivalent to 1.3% of the GDP (approximately 250 billion forints in 2003). However, if it is considered that not all people who are paid the minimum wage are fraudsters and their true pay is lower than that of similar workers paid above the minimum wage, labour demand is price elastic and combating tax evasion is expensive, then this figure most likely remains well under 1% of the GDP.

In a similar analysis, *Elek et al.* (2009b) sought to answer a similar question: by how much would budget revenues have increased if all workers paid the minimum wage had been receiving the simulated wage using the double hurdle model? The estimated impact on the budget was 0.6–0.7% of the GDP – in the case of companies with five or more employees. *Krekó and P. Kiss* (2008) estimated the loss from the tax base as a result of workers paid the minimum wage or less at 2% of the GDP (out of this the loss of tax revenue could be around 1% of the GDP), however this is biased by the overestimation of the number of minimum wage earners. Whichever findings are considered, the hidden tax base of disguised minimum wage earners is considerable smaller than the loss of the tax base due to tax evasion by entrepreneurs and VAT fraud. *Krekó and P. Kiss* (2008) estimated these at around 7% and – as previously highlighted – 12–14% of the GDP respectively in 2005–2006.

The easiest way to combat underreporting seems to be an increase of the minimum wage. This was one of the arguments in favour of the minimum wage increases of 2001–2002, and it was one of the stated aims of the introduction of the double contribution liability in 2007. However, in addition to its benefits – no additional cost – this solution has major disadvantages. Various studies (*Kertesi and Köllő,* 2004; *Halpern et al.* 2004; *Köllő,* 2008) pointed out that the increase of the minimum wage reduced labour demand and made low-productivity and low-paid labour more expensive. On the other hand, as is clearly shown by *Table 6.1*, raising the minimum wage will only have a small impact on the total amount of foregone labour taxes and contributions. A drastic increase, for example by 20,000 forints, would reduce the tax base hidden by the top quintile only by 10%: instead of 285,000 forints on average to 265,000 forints (or in the second quintile from 106,000 forints to 86,000 forints). Considering that the top two quintiles hide four fifths of the total wages, the overall "whitening" effect would not be significant; nevertheless it would make it considerably more expensive to employ low-productivity workers.

Underreporting at the minimum wage level among employees became negligible in 2007,[18] and peaks appeared in the wage distribution around the "skilled minimum wage" and the double of the minimum wage. Changes in the composition of people underreporting their wages are illustrated by characteristics of the 80,000 employees who were paid twice the minimum wage in 2007. The average wage of this group was only 91,500 forints in 2005; therefore they saw

18 See for example *Elek et al.* (2009b, Figure 4) on the trends in the number of minimum wage earners between 2000 and 2007.

an increase of over 40% in two years. This was considerably higher than the 20% which people earning less than twice the minimum wage in 2007 achieved in two years. This suggests that the prevalence of tax evasion was higher than the average in the second group in previous years (and it is likely that they are still receiving some of their pay as envelope wages on top of their increased wage). There were significantly more people from Budapest and in managerial positions among those earning twice the minimum wage than among those earning slightly less. The suspicion of underreporting is further increased by the fact – as shown by *Elek et al.* (2012) – that companies labelled as fraudulent in 2006 were more likely to increase the pay of their minimum wage earners to the double of the minimum wage in 2007 than other companies.

It should be noted that the differentiation of the minimum wage and the introduction of a contribution base that is larger than the minimum wage – if implemented out of budgetary considerations – essentially mean a simple form of *presumptive taxation*. This simple form implies excessively high tax burden for some businesses while others can easily comply with the regulations. Differentiating the minimum wage according to certain employee characteristics cannot be considered a sophisticated solution either, because presumptive taxation would require the definition of contribution minimums adjusted to the characteristics of businesses.[19] However differentiating according to educational attainment seems adequately targeted from a budgetary perspective in Hungary, considering that around nine tenths of graduates who are paid the minimum wage are fraudsters according to the findings of the above studies.

Unfortunately there is limited information about tax evasion above the minimum wage, an area becoming increasingly important, and its analysis poses serious methodological difficulties. The main drivers for tax evasion probably remained the same and only the peak at the minimum wage became "blurred"; thus underreporting of wages remains an important area for research.

Tax behaviour of the self-employed

Due to its special nature, the tax behaviour of the self-employed is discussed separately. Compared to employees, they have more – legal and illegal – opportunities to minimise their tax liabilities, for example by declaring their labour income as capital income. Based on a comparative analysis in the European Union, *Krekó and P. Kiss* (2007, 2008) estimated the loss of tax base for the self-employed at around 6,7–7,5% of the GDP and the loss of tax revenue approximately half of this between 2005 and 2007.

Similarly to the tax-price elasticity literature discussed in *Chapter 2* of *In Focus – I*, *Benedek* (2011) estimated the elasticity of taxable income among the self-employed, and disaggregated it into labour supply and other (mainly tax avoidance) responses.[20] The tax reform used for the analysis was the introduction of the simplified business tax (in Hungarian: egyszerűsített vállalkozói

19 About the notion and its application see for example *Musgrave* (1981), *Tanzi and Casanegra di Jantscher* (1987) and *Arachi and Santoro* (2007), regarding applicability in Eastern Europe see the papers by *Pashev* (2007) and *Wallace* (2002).

20 For a similar international study see *Kopczuk* (2010).

adó, EVA) in 2003. For those who opted in, the simplified business tax offered a general low marginal tax rate as opposed to the complex and higher marginal tax rates of the regular business tax. The EVA replaced not only the personal income tax for entrepreneurs but also dividend tax as well as VAT; however the tax base was the gross revenue that could not be reduced by offsetting the expenditures of the company. Therefore switching to EVA was worthwhile primarily for medium and high income companies with small expenditure ratios.

The database used by *Benedek* (2011) was a 10% sample of entrepreneurs submitting a tax return in 2006 that included each line of the tax return as well as information about gender, age, labour market status and region for 2000–2006. The analysis was based on data from 2001 and 2004.

The results of the estimation showed that the marginal tax rate had a significant impact on the income reported by entrepreneurs. The estimated tax-price elasticity was 0.07–0.12 depending on the specification. This value includes all possible channels of response – i.e. labour supply, tax evasion and the reclassification of income (for example between salary and non-salary payments). When the regression also controlled for tax evasion using proxy variables, the estimated elasticity dropped to 0.043–0.055. Considering that the role of non-salary payments is limited for entrepreneurs, the two main forms of adaptation were labour supply and tax evasion. Thus the latter could be considered labour supply elasticity of entrepreneurs, and the difference between the two values was explained primarily by the elasticity of tax evasion.

This estimated total elasticity is low compared to other countries, particularly the elasticity found in the United States; however it is somewhat higher than the elasticity of employees estimated using data from Hungary (for more on the results of estimations in the international literature and research in Hungary, see *Chapter 2* of *In Focus – I.*) As will be shown in the next sub-chapter, tax evasion among entrepreneurs is very high. This suggests that they aim to minimise their tax liabilities under any conditions either using legal tax optimisation methods or tax evasion; this explains the relatively low tax-price elasticity. Contrary to total elasticity, the elasticity of labour supply can be considered substantial – although low by international comparison – which shows that the real productivity of entrepreneurs responds to changes in taxation.

Tax evasion and income redistribution

Finally, the extent of tax evasion is examined using indirect methods. Indirect methods using micro data estimate tax evasion by comparing income and consumption information (e.g. *Pissarides and Weber,* 1989, *Lyssiotou et al.,* 2004) or different income categories (e.g. *Fiorio and D'Amuri,* 2005, *Matsaganis and Flevotomou,* 2008). These calculations do not distinguish black and grey employment, and other forms of tax evasion, therefore they can be considered an overall measure of tax evasion.

Benedek and Lelkes (2011) compared data from the HCSO's household budget survey (HKÉF)[21] with individual-level data from the tax authority to estimate the impact of tax evasion on redistribution and revenues. To estimate tax evasion at the individual level, information on both real and reported income is necessary. The problem is that no single database in Hungary has both type of data, so the database for the analysis must be merged from two different sources.[22] The joint database of the household budget survey and tax data is suitable for estimating the underreporting of income.[23]

It is estimated that income is underreported on average by 9–13% *(Table 6.2);* however it varies greatly according to the level of income.

Table 6.2: Underreporting of income by taxpayers' income deciles, 2005

Taxpayer's income decile based on real income[a]	Real taxable income (thousand forints)	Extent of underreporting[b] (percentage)
1st (bottom)	301	26–30
2nd	692	25–29
3rd	892	14–18
4th	1,070	10–14
5th	1,248	9–13
6th	1,432	8–12
7th	1,690	9–13
8th	2,014	8–12
9th	2,560	10–13
10th (top)	4,534	13–16
Mean	1,682	9–13

[a] Real income: gross taxable income in 2005.
[b] Underreporting of income = (Real income – Reported income)/Real income. The estimations were run using two specifications, the bottom and top values indicate the results of the two estimations.
Source: *Benedek and Lelkes* (2011).

The underreporting of income is U-shaped: it is highest at the bottom and top end of the income distribution. It is approximately 14–30 per cent among the bottom third of tax payers and 13–16 per cent in the top decile, while it is lower among middle-earners. As a percentage, the prevalence of underreporting is highest among the low paid; however in absolute terms its value is much greater in the top decile.

Apart from the income, there are substantial differences in terms of other variables as well. Entrepreneurs underreport their income by around two thirds (67%), while the same figure among employees is only four per cent. Nevertheless, high underreporting among entrepreneurs is not characteristically Hungarian. For example a study found that even in Sweden – which has a high level of tax compliance, entrepreneurs underreport their income by about 30% (*Engström and Holmlund,* 2009). Underreporting is higher among men than among women, which might be explained by men's smaller risk aversion

21 *In Focus – I* already uses the new name of the Hungarian Central Statistical Office's Household Budget and Living Conditions Survey (KSH HKÉF). However, that paper still refers to it by its previous name: Household Budget Survey (HKF).

22 The estimation uses the following two samples: First, the budget survey from 2005 (representative of the Hungarian population) with 9,270 active age participants who, by their own admission, pay taxes. Second, an approximately 5% sample of personal income tax returns for the tax year 2005, that consisted of 217,530 tax payers after data cleaning. Both datasets had information about individual characteristics that were the basis for the statistical matching to integrate the two datasets. The source of real taxable income was the budget survey; meanwhile information on the reported income came from the tax dataset.

23 The utilisation of this method is based on the assumption that the budget survey provides information about real earnings with no under-reporting. However, if earnings are under-reported by households – although they are higher than in the tax dataset – then the computed under-reporting underestimates the real level of under-reporting.

(*Eckel and Grossman,* 2008). In terms of regional distribution, the findings suggest that underreporting is highest in Central Hungary, followed by West Transdanubia. Finally, tax evasion is somewhat higher in older age groups and that might be explained by the higher prevalence of entrepreneurs in this category *(Table 6.3)*.[24]

Table 6.3: Underreporting of income by main source of income, region, gender and age group, 2005

	Share of population (percentage)	Estimated reported income[a] (thousand forints)	Underreporting of income[b] (percentage)
Main source of income			
Wage	90	1550	4
Business income	10	770	67
Region			
Central Hungary	31	1796	17
Central Transdanubia	11	1380	8
West Transdanubia	12	1350	13
South Transdanubia	7	1284	9
Northern Hungary	12	1363	5
North Great Plain	13	1287	9
South Great Plain	14	1295	12
Gender			
Male	50	1581	17
Female	50	1362	7
Age group			
16–29	18	1147	9
30–44	39	1497	14
45–59	41	1593	12
60–65	2	1462	20

[a] Real and reported income: Gross taxable income in 2005.
[b] Underreporting of income = (Real income – Reported income)/Real income
Source: *Benedek and Lelkes* (2011).

The impact of tax evasion on the income distribution can be examined using a microsimulation model. As a result of tax evasion, families pay approximately 20% less personal income tax than they should be paying based on their true income. If tax evasion is taken into account, income inequalities are much greater than suggested by reported income. In this case, the Gini Coefficient and the P90/P10 indicators are around 5–7% higher, mainly as a result of higher underreporting of income among high earners. This also explains that taking tax evasion into account the 2005 tax system was less progressive than it seemed on the basis of reported income.

24 The latter two findings seemingly contradict the findings regarding black employment: this suggested that the prevalence of undeclared employment was lowest in the Transdanubian regions and highest in the youngest age group. However, this subchapter looks at tax evasion in general and not only undeclared employment.

Concluding remarks

This chapter has provided an overview of empirical findings related to black and grey employment as well as tax evasion in Hungary, based on micro-level data. According to estimates based on the comparison of KSH's Labour Force Survey and administrative data, the prevalence of undeclared (black) work was around 10–17% – depending on the methods used and the selection of the sub-sample – in Hungary between 2001 and 2007. The findings do not highlight any noteworthy trends over time. The prevalence of black work is above average among men, the self-employed and in Central Hungary, as well as in certain occupations such as building construction and services.

To examine the phenomenon of grey employment, the number and distribution of disguised minimum wage earners in 2006 – before the introduction of the double minimum wage rule – was analysed using the double hurdle econometric model. It was estimated that disguised minimum wage earners are concentrated in certain groups: their number and share was higher for example in the construction and retail sectors and in micro enterprises. In other occupations that are also characterised by a high number of minimum wage earners – for example cleaners and unskilled workers –, the prevalence of underreporting of income was much lower. It was also shown that over half of the loss of the tax and contribution base could be attributed to the top quintile of the true earnings distribution. Therefore a uniform increase of the minimum wage – apart from reducing the employment of unskilled workers who were really paid the minimum wage – has only a limited impact on the amount of wages hidden from taxation, and thus, it does not have a substantial aggregate impact on reducing the shadow economy. Differentiating the minimum wage based on carefully selected characteristics (such as the introduction of a university graduate minimum wage), however seems to be an effective measure.

Finally, the total amount of unreported income – from black and grey employment as well as other sources – was estimated comparing data from the Hungarian Central Statistical Office's Household Budget Survey and tax returns submitted to the tax authority. The average rate of underreporting was found to be 9–13%, higher in the lowest and highest income groups. Estimates concerning the distribution of underreporting were by-and-large similar to the findings related to black and grey employment: tax evasion was higher among men, entrepreneurs and in Central Hungary.

6.1. The prevalence of envelope wages and the fear of unemployment

ISTVÁN JÁNOS TÓTH & MIHÁLY FAZEKAS

There are different types of undeclared work. A worker can be (a) employed by an unregistered business, (b) employed illegally by a registered business, (c) employed legally by a registered business and receive one part of their wage declared to the tax authorities and the other part as an undeclared envelope wage. If a worker is not employed by the company although effectively works there and receives his/her payment against a VAT invoice issued by another company (typically his/her own) then this is considered a variant of case (b) or (c).

This chapter explores whether the crisis has had an impact on the prevalence of envelope wages and it also looks at the relationship between previous unemployment experience and workers' willingness to accept envelope wage payments. First, the potential effects of the crisis will be discussed, then the data for the analysis, and finally the main findings will be presented.

In terms of undeclared work, registered businesses could have responded to demand and supply shocks associated with the crisis or unrelated government shocks (such as the increase of the minimum wage, statutory pay increases etc.) in a number of ways: 1) they laid off some of their workforce and "re-employed" them illegally, 2) increased the share of envelope wage payments within the workers' pay package, or 3) they increased the proportion of undeclared workers against declared workers, in extreme cases they froze hiring legally and only took on undeclared workers who were then paid envelope wages. All three adjustment strategies lead to the increase of envelope wage payment both in terms of prevalence and amount.

On the contrary, it might also be argued that the crisis and government measures had a negative impact not only on companies that register their employees but on the undeclared labour market as well. Demand for the products of businesses employing undeclared workers also *declined* despite their relative advantage in terms of labour cost compared to their competitors that employ registered workers (to a greater extent). Furthermore the decline in the share of undeclared work might also be associated with *sectoral* factors: due to the decline in consumption (particularly consumer services characterised by high under-reporting) and its stagnating at a lower level than before the crisis, or the collapse of the construction industry in Hungary, companies that relied more heavily on undeclared work might have been more likely to leave the market or reduce the number of their (undeclared) workers.

However, another possibility is that the flat income tax introduced in 2011 might have created incentives for declared as opposed to undeclared work for both employers and – particularly higher-paid – employees through the reduction of the tax wedge and no changes in the probability of inspection. These potential effects could have reduced the prevalence and extent of envelope wage payments.

The sum of the various effects can only be established with empirical analysis using multiple data sources. This chapter presents the relevant findings of two surveys that can provide useful information for further economic analysis. The first survey took place in 2008 and the second in the spring of 2012, both using a sample of 1,000 adults from the general population aged between 18 and 60 years.* Data was representative and homogeneous in terms of gender, age groups and type of settlement in both surveys.

Results suggest that at least 14.6% of 18–60 year olds received envelope wage payments at least once in the previous two years in 2008, while the same figure was 14.4% in 2012 – therefore the situation has not changed over the past four years. The survey also asked those who received part or all of their pay as an envelope wage to estimate the share of their last such pay within their total net earnings. Again, there were no considerable changes compared to the situation before the crisis: 29 per cent said that they received less than a quarter of their net earn-

* For the questionnaires and main characteristics of the surveys see link in the on-line version.

ings as an envelope wage payment, 17 per cent said less than half, eight per cent said no more than three quarters, three per cent said more than that but not their total pay, and 44 per cent stated that they received their total pay as an envelope wage.

There were various changes in the relationship between the prevalence of envelope wage and the characteristics of workers over the past four years; however the direction and strength of correlations often remained the same. For example, receiving envelope wage payments was more common among men (18–19%) than women (11%) both in 2008 and 2012.

Similarly, the willingness to accept envelope wage payments was consistently associated with previous unemployment experience. While 9 per cent of respondents who had never been unemployed received envelope wage payment in 2008 and 2012, 22 per cent of those who had experienced unemployment before said that they had received envelope wage payments within the previous two years.

With regards to other factors, there were some changes. In 2008 envelope wages were significantly more prevalent among workers in Budapest (19%) than those in the countryside (14%); by 2012 the situation changed and they became less prevalent in Budapest (12%) and increased somewhat among those living in the countryside (15%). There were similar changes in the age groups of workers: while in 2008 envelope wages were more common in the age group under 30 (21%) and 30–44 (16%) (their prevalence being 9% above 45), in 2012 the prevalence of envelope wages was high only among young people (20%) and in the other two age groups it was 13%.

Looking at the characteristics of people who take up undeclared work in the 2008 survey, it emerges that envelope wage payment was particularly common in a clearly defined group of workers (those avoiding poverty) – see *Fazekas et al.* (2012). This group is characterised by not having any assets apart from the property where they live, have a low level of education, work in semi-skilled or vocational jobs and often they or one of their family members has already experienced unemployment. People in this group move between a) legal employment with fully declared pay, (b) undeclared work and (c) unemployment. This highlights the link between unemployment and the prevalence of envelope wages. It can be assumed that the acceptance of undeclared or mixed pay is heavily influenced by the risk of unemployment. If there is such risk or it is higher, then the worker is more likely to accept envelope wage payments as well. The risk of unemployment was measured by asking the question "have you ever been unemployed since you first started working?" and the number of months in work during the previous year. The analysis of this relationship on the pooled database of 2008–2012 shows a correlation in the expected direction between past unemployment and receiving envelope wage payments (the probability of this is 2.7–3.2 times higher). The same result is obtained if gender, education, type of settlement and age are included in the analysis as control variables.[**]

[**] For detailed results see link in the on-line version.

6.2. Minimum wage or minimum tax?

MIRCO TONIN

What is the interaction between minimum wage legislation and the underreporting of earnings? *Tonin* (2011) looks at this issue by investigating the massive minimum wage increase that took place in Hungary in 2001, when the statutory monthly minimum wage was increased from 25,500 HUF (98 EUR or 90 USD using the average exchange rate for 2000) to 40,000 HUF (156 EUR or 140 USD using the average exchange rate for 2001).

The basic idea is that the minimum wage can have an impact on compliance, as it usually represents the smallest possible amount that has to be declared to be in the official economy. The impact is similar when declaring a sub-minimum amount is permissible, but attracts higher scrutiny by the tax authority (*Tonin,* 2013a).

In an environment in which firms and workers can collude to report to the fiscal authorities an

earnings amount that is different from the true one, the minimum wage poses a constraint on this decision and induces an increase in compliance by some, while pushing others out of the formal labour market into the black economy or into inactivity. As a result, there is bunching of declared earnings at the minimum wage level. Other things being equal, the higher the importance of underreporting in the economy or in a given sector or profession, the higher the spike in the distribution of declared earnings at the minimum wage level.

With underreporting of earnings, a minimum wage hike implies that some workers who on paper experience an increase in their earnings are actually just swapping some of the cash, "tax-free", payments for declared, and therefore taxable, income. As a result, they experience an actual drop in disposable income, as they are forced to declare a higher share of their true compensation (their effective tax rate goes up). Workers who were already declaring more that the new minimum wage before the hike, albeit possibly also underreporting, are instead unaffected.

Given that undeclared payments are not directly observable, it is necessary to employ some indirect measures to see whether this is indeed what happened in Hungary in 2001. *Tonin* (2011) looks at the change in food consumption or in the consumption-income gap, i.e. the difference between consumption and income in a given period, using the Hungarian Household Budget Survey Rotation Panel.

In particular, the study compares the change in food consumption (or the change in the consumption-income gap) in the period 2000–2001 between households affected by the minimum wage hike (the treatment group) and similar but unaffected households (the control group). Households in the treatment group are those with at least one member employed before the hike in the private sector for a (declared) wage above the minimum wage in force (25,500 HUF), but below the much higher to-be minimum (40,000 HUF). Households in the control group are those in which there is an employee with a similar wage employed in the public sector or an employee earning somehow above the to-be minimum before the hike. These two groups are comparable in the sense that there is a lot of overlapping in terms of total household income and, more importantly, the dynamics of food consumption did not differ between these two groups in the period just prior to the minimum wage hike, i.e. in 1999–2000.

What the analysis shows is that the dynamics of food consumption (or of the consumption-income gap) instead differs after the minimum wage hike, with households that apparently gained from the higher minimum wage, the ones in the treatment group, experiencing a drop compared to households in the control group. Interestingly, when considering skilled and unskilled/semi-skilled employees separately, the drop is present only for the former group, while there is no drop whatsoever for the latter. This suggests that underreporting of earnings is concentrated among relatively high productivity (skilled) employees declaring low wages rather than among low productivity (unskilled/semi-skilled) employees, who are more likely to be genuinely earning wages close to the minimum. There is also some evidence that, when considering skilled employees, the effect is particularly strong for households whose total income is relatively high, i.e. above 100,000 HUF.

One alternative explanation for the drop could be an increase in labour market risk after the minimum wage hike for the treatment group. If labour market risk were indeed the driver, then one would expect the low skilled to have a stronger treatment effect compared to skilled employees, while the opposite appears in the data. In any case, to avoid this confounding factor, only employees who remained employed for at least 12 months after the hike, i.e. for the whole of 2001, are considered in the analysis. This makes it more likely to have workers with an under-declared wage in the sample used in the analysis than in the population as a whole. One indeed could expect workers receiving cash side-payments to be more likely to keep their job after a minimum wage hike compared to workers complying with fiscal regulation, as unreported income may act as a buffer to absorb the minimum wage shock.

The study suggests that the minimum wage can affect compliance with fiscal regulation. However,

it is rather blunt as an instrument to fight underreporting. A too low minimum wage would fail to make a dent on underreporting, while a too high one may push firms and workers underground or simply price-out low skilled workers. It is possible to devise similar but more targeted instruments to fight underreporting. Bulgaria, for instance, has introduced sector- and occupation-specific "minimum social insurance thresholds" on which social security contributions have to be paid (*Tonin,* 2013a).

Tonin (2011) has thus shown evidence of underreporting of earnings and its interaction with minimum wage legislation in the Hungarian context. These issues, however, are not specific to Hungary. Within European labour markets, there is evidence of a positive correlation, after controlling for the minimum wage level, between the extent of underreporting of earnings in the economy, as measured through a Eurostat survey (*EC,* 2007) on cash-in-hand payments by employers, and the proportion of full-time employees with earnings at the minimum wage level (*Tonin,* 2013b).

This correlation is consistent with the role of the minimum wage in an economy with underreporting highlighted above, while it is possible to exclude alternative explanations related to the prevalence of small firms in the economy or to the tax rate. The practice of officially declaring the minimum wage and paying additional remuneration as cash in an envelope seems not to be peculiar to Hungary, but is relevant in many countries in Central and Eastern Europe.

6.3. Tax evasion in the Hungarian mini-job scheme

ÁRPÁD FÖLDESSY & ÁGOTA SCHARLE

The advantages of mini-job type employment contracts

Simplified employment contracts, such as the German mini-job scheme can boost employment by reducing the administrative burden of hiring and employment, provided that the reduction is effective in practice. In most cases, the simplification is implemented in the compliance rules of taxes and contributions, e.g. in the case of Hungary, buying a single welfare contribution stamp replaces the reporting and payment of various social security contributions and personal income tax. The simplification decreases both the fixed and the transaction costs of hiring and employment, which on the one hand increases demand for labour (especially at low wage levels, where this fixed cost is relatively high, compared to wages), while on the other hand it may promote registered employment ("whitening").

In Hungary, the so called stamp book for casual workers (stamp book or SB hereinafter) introduced in 1997 and abolished in 2010 included further incentives: in most years, the price of welfare contribution stamps was lower than the sum of taxes and contributions on the minimum wage payable in a regular employment contract. The most favourable year was 2005, when the tax and contribution burden was 18–24 per cent of the total wage cost with a SB, as opposed to 40 per cent in a regular contract at the minimum wage (*Budapest Institute,* 2012).

Previous studies on the whitening effect of the stamp book for casual workers

The stamp book reduced wage costs as well as administrative costs for seasonal and casual labour. This may have increased demand for labour and may have reduced unregistered employment. In the following, we only consider the latter effect. The actual whitening effect of the stamp book – in contrast with the unambiguously positive demand effect – cannot be predicted on a theoretical basis. In accordance with policy aims, it might have provided an incentive for reporting previously undeclared labour (whitening), but unintentionally, it also promoted the legal or semi-legal underreporting (greying) of the wage cost for registered employment. Determining the relative magnitude of these two effects is an empirical question.

Previous studies on the stamp book, along with non-representative surveys and reports prepared by the government administration mainly focus on the types of abuse, e.g. the case of buying fewer

welfare stamps than implied by the actual number of hours worked (*ÁFSZ,* 2008; *Semjén et al*. 2008a, 2009a). However, the recurrence of such forms of abuse does not necessarily prove that the stamp book was ineffective. Consider the case of when the worker in question had been engaged in fully unregistered (black) work or was not employed at all: his or her employment with a stamp book would in this case generate revenue for the budget and increase registered employment even if the contribution stamps were not paid for the full length of their contract.

Semjén et al. (2008b) survey the employment record of workers using the stamp book in the spring of 2008.[*] Their results indicate that in most cases the booklet was used either to legalize previous black employment to some extent, or during a period of probation. The survey also revealed that most respondents never met a labour inspector during their employment, or if they did, the inspector did not always fine the non-compliant employer. Finally, *Elek et al.* (2009b) analysed the whitening effect of the stamp book using the administrative data of the Central Administration of National Pension Insurance (in Hungarian: Országos Nyugdíjbiztosítási Főigazgatóság, ONYF). According to their calculations, the bigger half of those employed with a stamp book in 2006 had no other, registered job during the year, In fact, a vast majority of them had not worked in a registered job in the preceding two years. However, the revenues gained from the stamp book were modest (around 3 billion HUF in 2006), which implies a net fiscal loss even if as little as 5 per cent of that smaller half of potential cheaters did in fact abuse the booklet.

Examining the stamp book using administrative data

The linked administrative database of the Institute of Economics, Hungarian Academy of Sciences allows us to examine the performance of the stamp book over a longer time span (see the Appendix by Mónika Bálint in *Chapter 1* of *In Focus – I*).[**] The raw aggregate data reveal a rapid increase in the number of stamp book contracts, mainly among those who had been previously unemployed. There was also a rapid rise in the number of workers without any prior registered status which would have made them eligible for social security benefits. The majority of those previously unemployed had been registered as such for several months prior to entering employment with the stamp book. The share of those who had been unemployed for one month only, was just below 15 per cent – and did not increase substantially in the months when the formerly unemployed could be employed at a reduced contribution rate. However, around 20–25 per cent of those with a stamp book had previously worked in regular, declared employment. Those switching from a fully registered job to grey employment would be found in the latter group, but not all of this group may be cheaters. Considering the above, we estimate that roughly one quarter of those employed with a stamp book contributed to the "greying" of employment. At the beginning of the period under analysis, the degree of abuse at the individual level was still minor: between 2002 and 2006, the median of the previous wages for those entering a SB job from a regular job was 0–3 per cent larger than the minimum wage in the given year. The same value is 12–18 per cent for 2007 and 2008.

The composition of those employed with a stamp book confirms our assumption based on prior labour market status (i.e. that those who had worked before are shifting to grey employment). Those entering a SB job from unemployment are on average less educated, they had been unemployed for several months prior to entry, and there was no significant increase in the number of such entrants between August 2002 and December 2005, when previously unemployed jobseekers paid a discounted contribution rate in a SB job. By contrast, those who had a registered employment spell before their SB job were more likely to enter during the discount period,

[*] The survey was conducted in April 2008, in Szabolcs and Győr-Sopron counties and Budapest, in a sample of 159 individuals.

[**] We used the version of the database which contains the originally daily-level labour market information in monthly aggregates.

more likely to have a short period of unemployment before their SB job, and less likely to live in the disadvantaged northern regions.

In summary, the share of workers entering a SB job from regular employment (i.e. those potentially shifting to grey employment) is considerable, but in our calculations, remains below one quarter of SB workers. Based on previous studies, according to which grey employment is more common e.g. among men and in the central part of the country, the improved targeting for labour inspection may be an efficient tool for curbing the abuse of the stamp book.

Determining the net fiscal impact of shifts between black, grey and fully registered employment would require further and more detailed calculations, on a database which documents the nature of employment relationships on a daily basis. Finally, in order to determine the net benefit of the stamp book, one would also need to estimate labour demand effects. This is because the reduction in the wage cost could potentially increase employment (white, grey, or black), either through an increase in hiring (if some of those labelled above as "becoming whiter" had in fact not been employed before) or through a decrease in the risk of job loss (if some of those labelled as "becoming greyer" would have lost their jobs in the absence of the SB scheme).

APPENDIX

The MTA KTI–TÁMOP database

The database contains data on half of the population aged 15–74 in Hungary, using the social insurance number to link administrative datasets from the Central Administration of National Pension Insurance (in Hungarian: Országos Nyugdíjbiztosítási Főigazgatóság, ONYF), National Health Insurance Directorate (in Hungarian: Országos Egészségpénztár, OEP), the Hungarian State Treasury (in Hungarian: Magyar Államkincstár, MÁK), and the National Labour Office (in Hungarian: Nemzeti Munkaügyi Hivatal, NMH). The database originally contained records of variable length. It was subsequently homogenized, so it currently records whether an individual was employed on the 15th day of each month between January 2001 and 2009. For computations reported here, to ensure comparability of the datasets, assisting family members and employees claiming old age pension have been excluded from the Labour Force Survey (LFS). Furthermore, we only considered those birth cohorts that might have been included in the administrative dataset. Employees in the LFS may include a subset of farmers exempt from tax and contribution payment (licensed traditional small-scale producers, in Hungarian: őstermelő) and therefore excluded from the ONYF dataset. Currently the database is undergoing preliminarly tests to assess the reliability of the data. Once these are over, the database will become accessible for the broader research community. A more detailed description of the database and its availability is provided in the Appendix of Chapter 1 of *In Focus – I.*

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INFOCUS – II
THE EFFECT OF EMPLOYER CHARACTERISTICS ON WORKER OUTCOMES

Edited by
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EDITOR'S FOREWORD

ÁLMOS TELEGDY

The Effects of Firm Attributes on Worker Outcomes

The wage or employment effects of individual characteristics such as gender, level of education, experience in the labor market or family background have been central questions in labor economics since its beginnings. During the 1980s, however, as databases became more and more sophisticated and firm-level data were made available, a number of economists turned their attention to the linkages between workers' wages and the characteristics of firms they work for. This literature has increased rapidly ever since, and typically focuses on union status, industry and size of firm, ownership (usually foreign, state and employee ownership), and the firm's involvement in international trade.[1]

The first question which may occur to those who try to assess the impact of this large and growing literature is whether it is all that important. Do workers who are identical in their observed and unobserved productive characteristics receive different wages just because they work for different employers? At the first sight, there is no reason to believe this: after all, there is only one labor market on which workers compete for employment opportunities and firms try to choose the best employees they can afford. The labor market, however, is more complex than this rather simplistic view suggests.

The reasons for wage differentials of workers with similar productive capacity are multiple.

First, workers do not consider only the rate of pay when they decide which job offer to accept, but take into account a range of job attributes, of which the pay rate is only one. Such job characteristics are many, some giving extra utility to the worker (such as a pleasant working environment or interesting tasks) while some rather make jobs unattractive (long working hours, night shifts, high risk of injury or death, monotonous work and so on). As firms face different costs to provide amenities and decrease disamenities (for example, by creating a safer environment), and workers have different preferences across these attributes, some will choose firms that provide less of the amenities if they are compensated for them in the form of higher wages (*Rosen*, 1986).[2] Since the level of amenities and disamenities can vary at the industry, occupation or firm level, they create wage differentials which correlate with these firm characteristics (or the firms themselves).

1 *Pencavel* (1991) discusses the theoretical and empirical aspects of the effects of unionization on labor markets while *DiNardo and Lee* (2004) adapt a novel approach to the union wage differential measurement. An early example of inter-industrial wage differentials study is *Groshen* (1991); *Kertesi and Köllő* (2003a, 2003b, in Hungarian) discuss this in the Hungarian context. The effect of firm size and wages is summarized by Oi and Idson (1999). *Brown et al.* (2010) study the employment and wage effects of privatization, *Bonin et al.* (1993) and *Hansmann* (1996) discuss the behavior of employee-owned firms and *Huttunen* (2007) analyzes the effects of foreign ownership on wages and employment composition. *Johnson and Stafford* (1999) provide a synthesis of the labor market effects of international trade.

2 For example, risk averse workers prefer firms (or jobs) which are safer, but they are likely to pay for this in the form of lower wages. Their less risk averse colleagues rather accept jobs which are riskier but provide a higher salary. Note that this is a competitive model of wage determination: it simply replaces the salary of the worker with total compensation, which includes any job attribute that is important to the worker and (potentially) costly to the employer.

The second reason is that it may be beneficial for employers to compensate workers above the market wage: if the productivity of workers is tied to their compensation (so higher wages promote higher effort), then it is rational for a profit-maximizing firm to pay "efficiency wages" – wages above the market clearing level (*Shapiro and Stiglitz*, 1984). A similar reasoning can be applied when not worker effort, but quits alter the profits of the firm. If employers incur fixed costs of labor (which are the hiring and firing costs), it is in their interest to induce workers to stay with the firm as long as possible so the fixed costs are spread across many time units.[3] In this case higher-than-market wages may reduce the workers' incentives to quit and thus can indirectly increase the firms' profits (*Stiglitz*, 1985). If monitoring costs (which are directly related to workers' effort level) and the fixed costs of labor vary by firm type (for example, by industry, or firm size) then the efficiency wage mechanism will bring about wage differentials which are related to such firm characteristics.[4]

Third, the productivity of workers does not depend only on their abilities, but also on whether they and their employers are a good match or not. If labor markets were frictionless, each worker and firm would find the best match and so their joint productivity (and therefore the wage of the worker) would be the best possible achievable. Search and hiring costs, however, hamper the creation of the best employer-employee matches. Getting a suitable employer (or an employee, from the point of view of the firm) is a probabilistic mechanism: some workers find employers they can work well with, while others are less lucky and get into employment relationships which are less successful. This probabilistic process will have an effect on wages, and two very similar workers may end up having very different wages just because one was lucky enough to find a good firm while the other was less successful in her search.[5] Again, if some firms put more effort in their search for potential employees, they will on average find better matches, which will be reflected by their salaries.

Finally, some types of employers may have different objectives than the conventionally assumed profit maximization of investor-owned enterprises. One obvious candidate for such behavior is the employee-owned firm, where the employee-owners may pay themselves all realized surplus in the form of wages, or may be willing to trade off high wages for safe jobs (*Earle and Estrin*, 1996). A second candidate for non-profit maximizing behavior is state ownership. Firms under state ownership may pursue social goals rather than profit maximization, or politicians controlling firms may maximize votes with the help of the firm's resources; either of these objectives may result in higher employment and wages (*Shleifer*, 1998).

Data and Measurement

Studies analyzing the linkage between firms and wages rely heavily on data. Broadly speaking, the quality of the data can be classified by coverage, wheth-

3 Examples of fixed costs of labor are search costs, training costs of workers (including the lost production due to time loss of experienced co-workers), and severance pay.

4 See, for example, the study written by *Krueger and Summers* (1988), who analyze this question in the context of inter-industrial wage differentials.

5 See *Pissarides* (2000) for a general treatment of this subject.

er firms and workers can be followed in time and how long the panel is, and whether they have information on both firms and workers (thus forming a linked employer-employee dataset).

The coverage can be assessed in two different ways: whether it has information from all sectors (usually industries) of the economy, or whether it is a sample or it covers the whole population of firms.[6]

The longitudinal length of the data is also of crucial importance. A common problem in such studies is that firms and workers are not randomly allocated with respect to the variable of interest. For example, firms under foreign ownership may be fundamentally different from domestic ones in many dimensions; those which engage themselves in international trade may also be different from those which buy their inputs and sell the produced output exclusively on the domestic market. Such selection may create channels through which wages are different across types of firms, but this is not caused by the variable of interest but some other firm attribute which is correlated with it. For example, foreign-owned firms may be established in industries which pay higher wages or in regions where wages are high. Exporting firms may have been more productive and paid higher wages already before they engaged in international trade. In these two examples, the wage differential between foreign and domestic firms and exporting and non-exporting firms is not caused by the variables of interest, namely foreign ownership and international trade. Not taking into account such selection may contaminate the measured relationship between firm attributes and worker outcomes. If the characteristics along which the selection takes place are measurable, the researcher may control for them explicitly. Many of these factors, however, are hidden to the researcher (but not to the managers or owners of the company who make the decisions regarding workers' wages). In this case panel data techniques, such as the inclusion of firm fixed effects of firm level trends can attenuate the selection bias. The difference in the estimated effects with and without controls for selection bias is often very large, thus demonstrating that the treatment of the selection problem is of the utmost importance.

Finally, information on workers' individual characteristics and wages also raises the quality of data in several important ways. The inclusion of worker characteristics may remove important biases and thus allow more precise measurement of the effects.[7] Second, some variables – wages, for example – can be measured more precisely at the individual level (if only firm level information is available, the wage measure is usually the average wage at the company). Third, some questions simply cannot be studied without worker information. An example is wage differentials within one firm, across genders, occupations, or age cohorts.[8]

6 This is a self-evident quality measure: one cannot analyze sectors which are not in the data, and the larger the sample is, the better the statistical properties the results will have.

7 Two firms, for example, may have different composition of the workforce. Not controlling for this composition may introduce a bias in the measurement of the firm characteristic on wages.

8 Hungary can boast perhaps the best datasets in the Central and East European region. Its firm-level data (gathered by the National Tax and Customs Authority) covers each double-entry book keeping firm, having information on the balance sheet and income statement (as well as some additional information, such as the employment level of the firm and its main activity). These data can be linked to the Wage Survey data (gathered by the National Employment Foundation) which have information for a sample of workers in a large number of firms, providing data on their individual characteristics, wages, and on their job (such as the exact job code and tenure). The data, unfortunately, is not a panel in workers (only in firms). Both datasets start in 1986 and new waves are continuously appended.

Short Summary of In Focus – II

In Focus – II is composed of four studies, each analyzing the effect of a firm characteristic on workers' wages and sometimes also on the employment level of the firms.

Chapter 1 (written by Mariann Rigó) analyzes how collective contracts (including, but not being restricted to wage contracts) result in a wage differential between covered and uncovered firms' workforce. Using data from the period 1992–2008, the unconditional wage differential between covered and uncovered firms' employees is quite large on average (around 20 percent), falling little when individual characteristics are controlled for. However, observable firm characteristics explain a large portion of the unconditional wage differential, which falls to 3.5–5 percent if these are included among the control variables. The wage gap further drops to 2–2.5 percent if unobserved firm characteristics are also controlled for. Analyzing the periods 1992–2000 and 2001–2008 separately suggests somewhat a larger wage differential for the first period (4.6 percent in 1992–2000 and 2.1 percent in 2001–2008) which is in line with the growing importance of the statutory minimum wages, which were increased substantially after 2000.

Chapter 2 (written by John Sutherland Earle and Álmos Telegdy) analyzes how wages change when a domestic firm is acquired by foreigners. The authors use two datasets, one at the firm level and one when individual worker characteristics and wages are linked to the firm level information, forming a linked employer-employee dataset. They find that foreign firms pay workers a very large premium of 46–60 percent. As practically always in such studies, the selection of target firms by the future foreign owners is likely to be non-random and taking this selection into account changes the results. Controlling for firm attributes (both observable and unobservable, but fixed in time) more than halves the estimated wage effect of foreign ownership. This reduction is sizable, but the estimated effect is still very large, in the order of 16–27 percent. A number of firms undergo two ownership changes during the period studied: from domestic to foreign and back to domestic ownership again. The authors use this subsample to test whether the foreign wage increase lasts even after the firm is sold back to domestic owners, and find that firms indeed pay higher wages after divestment. This wage premium (relative to the never acquired domestic firms), however, is much smaller than the one measured while the firm was in foreign ownership. The foreign wage effect, therefore, is linked to foreign ownership and mostly disappears when foreigners divest the firm back to domestic owners.

The analysis in *Chapter 3* (written by John Sutherland Earle and Álmos Telegdy) aims to understand the effects of another form of ownership: how are the employment size of the firm and the wages of workers altered in the case

of state ownership? This question is very important, especially in the light of the fear shared by both policy makers and the general public that privatization, will lead not only to productivity improvement, but to layoffs and lower wages as well (*Szentpéteri and Telegdy*, 2010). In the first part of the chapter the authors study the employment outcomes of privatization in a comparative perspective, using data from five Central and East European countries (Hungary, Lithuania, Romania, Russia and Ukraine). They control for selection with two econometric methods: firm fixed effects, which removes any observed and unobserved firm attribute fixed in time, and also firm-level trends, which, in addition to fixed effects, also removes any attribute linear in time. Contrary to the expectations of policy makers and the public at large, privatization does not lead to a large drop in firms' employment size, at least not when it is compared to state-owned enterprises. When fixed effects and firm-specific trends are controlled for, the estimated effects of domestic privatization are indeed negative (except in Russia) but their magnitude is smaller than 5 percent. Foreign privatizations, on the contrary, lead to firm growth in all countries except Romania, and the magnitude of the effect is larger than 10 percent in three countries. When the regressions are weighted by the employment size of the firm (and thus the estimated effects refer to the proportion of net employment change as a result of privatization in all initially state-owned firms), the estimated employment effects of domestic privatization are essentially zero (except in Russia, where the effect is still positive) and the beneficial employment effects of foreign privatization are also removed in the three EU countries but remain large and positive in Russia and Ukraine.

In the second part of this chapter the authors use only Hungarian data, and analyze wage changes when the firm is transformed from state into private ownership. Using linked employer-employee data, they find that domestic privatization does reduce the wages of workers, but the magnitude of the reduction varies by worker type. By demographic characteristics, females and young employees experience the smallest drop. Contrary to domestic privatization, the employees of state-owned firms transferred to foreign ownership experience a wage increase, which is especially large in the case of highly skilled workers.

Chapter 4 (written by Miklós Koren and Péter Tóth) analyzes the labor-market impacts of international trade. Using Hungarian firm- and worker-level data, the authors compare wages paid by exporting and importing firms to those paid by non-traders. More specifically, they ask how the wages of workers change when a firm starts exporting or importing. While trade is generally thought to be useful in facilitating the efficient distribution of resources, it is less well understood what effect it has on individual workers. A worker losing her job because of cheap imports will find little consolation in the fact that the country as a whole has become more efficient. The authors look at firm- and worker-level data to uncover the heterogeneity in worker experience.

Firm-level analysis is useful because it can control for broader trends and fluctuations in the economy and in the industry. For example, a sector might experience a surge in exports and a rise in wages because of cyclical demand. But if demand is as cyclical at home as it is abroad, trade has no direct effect on wages. The analysis can control for industry cycles by comparing firms within the same narrow industry. This is also a potential drawback, however. Several theories of trade predict a reallocation of resources across industries: as the country liberalizes, import-competing sectors shrink (resulting in lower labor demand, and, likely, lower wages), while exporting sectors expand.

The main finding of the chapter is that both exporters and importers pay higher wages, but the effect is stronger and more robust for importers. The wage premium paid by exporters seems to reflect firm selection: firms already pay higher wages several years prior to becoming exporters, probably because they have a better workforce. In contrast, the wage premium paid by importers gradually increases after the initial import has taken place. The finding contradicts the conventional wisdom that "exports are good, imports are bad." To understand why this is the case, the authors also present evidence on the effect of imports on firm performance: importing intermediate inputs and capital goods both contribute to higher firm productivity, which may result in greater market share. It seems that the bigger pie can then be shared with the workers of the firm. Hence, allowing firms to access import markets freely can boost demand for local labor.

Not all workers gain from increasing trade, however. Citing a recent study on the Hungarian food and textile sectors, the authors show that workers in certain occupations most affected by outsourced production (i.e., those whose output is now imported) suffer some wage decrease relative to workers at non-importing firms. Moreover, even among positively affected workers, the gains are not distributed equally: managers and highly skilled workers gain more, which suggests that trade might have contributed to the rise in wage inequality in the past two decades.

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1. ESTIMATING THE UNION – NON-UNION WAGE DIFFERENTIAL IN HUNGARY*

MARIANN RIGÓ

INTRODUCTION

Social dialogue is a traditionally strong institution in continental Western European countries. While social partners exercise their bargaining activity both at firm, sectoral and national level in these countries, and reach a bargaining coverage of close to 100 percent, social dialogue in transitional countries is a fragile institution showing a fragmented structure, and covers only a fraction of the workforce (*Neumann,* 2006b). The large discrepancy between the Western and the transitional countries is not surprising bearing in mind the different historical roots of the social partners. While trade unions in Western Europe inherited their attitudes from the Taylorist and Fordist, and later from the Japanese style organization paradigm,[1] trade unions in the transitional countries had to reorganize themselves, find their new roles in the fundamentally changed economic environment and cope with their social inheritance. The outcome in most transitional countries was an industrial relations system where the firm level is the most (and only) important channel of collective negotiations.

The difference between the two groups of countries (Western vs. transitional) is also mirrored by the number of studies analyzing the union wage differential. Though unionization is one of the most heavily studied topics in Anglo-Saxon countries and in continental Western Europe,[2] much less is known about the nature of industrial relations in transitional countries, and the available evidence is mostly presented by descriptive and case studies.[3] Based on these studies, researchers share the opinion that collective bargaining is weak in transitional countries, and unionism has little or small labour market impact. One aim of this paper is to revisit the assumed weak role of trade unions in these

* This study is based on *Rigó* (2012).

1 In the 50s and 60s, collective agreements in the Taylorist and Fordist work organizations limited employers' flexibility regarding wages and employment conditions to the smallest possible (e.g. rigid wage scale system, exact regulation of fringe benefits, system of job description specifying exactly the content of each job). Starting from the 80s, the Japanese style organization paradigm replaced the former rigid institution leaving some flexibility for the employer e.g. to reward employees by individual performance. The power of collective agreements was reduced later to "maintain a minimum solidarity" between employees and to "limit the flexibility of local bargaining" (*Tóth*, 2006b p. 150). The study by András Tóth in the Hungarian Labour Market, 2006 (*Tóth,* 2006b) yields a detailed analysis about the attitudes of the Western and transitional trade unions.

2 Concerning unionization in the US, see for example *Lewis* (1986)'s comprehensive summary or *Blanchflower and Bryson* (2004) and *Hirsch* (2003). *DiNardo and Lee* (2004), *Freeman and Kleiner* (1990) and *Lalonde, Marschke and Troske* (1996) use US enterprise-level data and focus on the labour market impacts of recent unionization. Regarding the experiences of continental Western European countries, see for example *Hartog et al* (2002), *Card and de la Rica* (2006) or *Gürtzgen* (2006).

3 The In Focus chapter of The Hungarian Labour Market, Review and Analysis 2006 (edited by Károly Fazekas and Jenő Koltay) gives a comprehensive overview of Hungarian industrial relations. For example, the studies by *Tóth* (2006a) and *Neumann* (2006a), (2006b) provide a detailed picture of the the employers' organizations and trade unions, describe the process of reorganization of these institutions after the regime change, and emphasize their current strengths and weaknesses. *Tóth* (2006b) analyzes the characteristics and attitudes of post-guild (Western European) and post-socialist trade unions. The Ministry of Social Affairs and Labour, being responsible for the collection and management of collective agreement records, publishes on its home page case studies of special industries. A country-level comprehensive study based on the industrial case studies is *Fodor, Nacsa and Neumann* (2008). *Pollert* (1999) provides a short overview of industrial relations during the transition in Poland, Hungary, Slovakia and the Czech Republic. The East German and the Hungarian experiences are compared in *Frege and Tóth* (1999).

There are only few studies quantifying the labour market impact of unionism in transitional countries. For an exception, see *Neumann* (2001) and *Kertesi and Köllő* (2003) analyzing Hungarian data, or *Iga et al* (2009) using Hungarian, Czech and Polish data.

countries by quantifying the wage impact of collective agreements based on the Hungarian, large, representative, linked, employer-employee panel data, which covers the period of 1992–2008 and includes detailed information on 17,783 firms.

Institutional Setting

The Hungarian institutional setting can be characterized as a heavily decentralized system where bargaining at the firm level – individual and collective bargaining – are the most important channels of the wage negotiations. Sectoral collective agreements are almost absent, and even if present, they are weak regarding their regulatory power.[4] Most of the employers' organizations are not entitled to sign sectoral agreements, and even if signed, they specify "opt-out" clauses concerning the most important restrictions. This situation results in sectoral agreements being nothing other than a "collection of good wishes" (*Neumann*, 2006b p. 129). Firm-level trade unions should pay 40 to 60 percent of their fees to higher level unions. However, the actual transfers are much smaller. Besides, trade unions at this level also need to cope with the lack of specialized staffs and experts. They have hardly employed any fresh graduates since they were first established, and tend to operate with only a few staff members these not being enough to fulfil the interest representation role.[5]

Union confederations at the national level are also able to influence the bargaining outcomes through their participation on the tripartite forum, which represents trade union confederations, employers' associations and the government, and issue recommendations for the minimum wage and for the annual wage increase. These recommendations serve as a guideline for the firm-level collective negotiations.

Workers at the company level are represented by two institutions: works councils and trade unions.[6] Works councils were set up by the Labour Code in 1992 to introduce a new form of employee representation, which is independent of union membership. The aim was to create an institution, which is close to the German model where works councils operate as a platform for joint decisions by the workers and managers on the most important questions. However, the co-determination rights in the Hungarian version were limited to the use of the social fund; otherwise, the workers were only given information and consultation rights. Moreover, the two institutions often overlap in Hungary having the same people in the works council's and trade union's seats. As the bargaining right of a union depends on the number of votes it gets in the works council, union members have strong incentives to ensure seats for their nominees in the works council. Thus, works councils are mostly regarded as useless and unnecessary institutions without any functional role.

The functionality of trade unions, which form the other channel of employee representation, also lags behind the functionality of their Western Euro-

4 *Neumann* (2006a, 2006b) analyzes the strategies of higher level (sectoral) trade unions and how they work. In the current study we highlight some important conclusions of the above papers.

5 The first wave of sectoral negotiations took place in 1992. The next wave occurred in 2005 when industry level agreements were signed in the construction and in the private security industries. In 2001, the share of employees covered by a sectoral agreement was 5.9 percent, which is quite low compared to the coverage rate of the single employer contracts, which was 37.2 percent (see *Statistical Data*, 2006 p. 295, Table 11.8.).

6 *Benyó, Neumann and Kelemen* (2006) yields a detailed analysis on how works councils function. In the current study we highlight the most important features emphasized in the study.

pean counterparts. While trade unions in Western countries aim to regulate employment relations "in the name of solidarity and equality" (*Tóth*, 2006b p. 151), trade unions in post-socialist countries try to avoid conflicts. Instead of representing the "automatic solidarity between employees" (*Tóth*, 2006b p. 155), collective agreements provide considerable flexibility for the employers to influence work conditions and wages.

Firm-level trade unions have the privilege by law to engage in collective bargaining and to conclude agreements. Once concluded, the agreement is automatically extended to all employees of the firm. While collective agreements in the Anglo-Saxon countries and in continental Western Europe include precise and strict regulations concerning wages, the Hungarian collective agreements have mostly vague or, in some cases, no regulations on wage elements. Collective agreements including regulations on wages are termed separately as wage agreements. Wage agreements have the same legal status as collective agreements, however, wage agreements are negotiated on a yearly basis, while collective agreements are often contracts of indefinite duration (*Neumann*, 2006b).

Fodor, Nacsa and Neumann (2008) provides a comprehensive summary of the concluded collective agreements. The authors, analyzing the text of 304 collective agreements in 20 industries, found that Hungarian collective contracts share the following main features. Most of the agreements include precise regulations on extra working hours, overtime work, non-wage and social benefits.[7] On the other hand, regulations on wage elements are vague specifying mostly only guaranteed wages[8] and formulating target wage recommendations. The elements of modern HR techniques (e.g. the specifications of performance pay, group bonuses etc.) are almost totally absent from the agreements.[9]

The coverage of agreements varies substantially by the size of firm, by industry, and also changes over time. Collective agreements are more likely to be concluded in large companies. For example, in 2004, only 9.4 percent of companies employing less than 50 employees concluded a wage agreement, while the coverage was around 50 percent in companies with more than 300 employees (*Statistical Data*, 2006, Table 11.16.). By industry, the mining, transport, and the electricity industry were the most covered sectors with a coverage rate of around 80 percent, while in construction, trade and financial intermediation the share of employees covered was around 25 percent (*Statistical Data*, 2006, Table 11.15.). Over time, the number of registered collective agreements does not show substantial variation ranging between 1200 and 1300 reported agreements in the period of 1998–2004 (*Statistical Data*, 2006, Table 11.3.). On the other hand, the number of registered wage agreements decreased from around 800 in 1998 to 515 reported cases in 2004. The drop in the number of wage agreements in recent years is due to the growing influence of the national level regulations in the wage determination. In 2001, the statutory minimum wage increased by 60 percent compared to its level in 2000, reaching higher values

7 These areas were traditionally well-regulated in pre-transitional collective contracts as well (*Fodor, Nacsa and Neumann*, 2008).

8 Guaranteed minimum wages are specified in those firms where wages explicitly depend on the performance of the employee. The guaranteed wage is usually the base salary or a certain fraction, usually 70–80 percent of the base salary.

9 There are a few exceptions in the chemical industry with collective agreements defining both the bonus-tasks and the allocation of bonuses.

than the firm-level trade unions hoped for. As a consequence, the number of agreements specifying higher wage increases than the national one dropped substantially.[10]

Comparing the institutional setting to other countries, industrial relations in Hungary can be characterized as being a mixture of the two main regime types, the Anglo-Saxon and the continental European ones. Similarly to the US and UK, the institutional setting is decentralized, the main level of bargaining is the firm, and since industrial agreements are rare and lack an effective extension mechanism, the two most important sectors of the economy are those covered by a firm-level agreement and the non-covered ones.[11] On the other hand, the dominant dimension of industrial relations in the Western European continental countries (e.g. in Spain, Italy, the Netherlands, Portugal) includes a network of sectoral agreements, which are practically extended to all firms in the economy. Firm-level agreements may coexist with industrial agreements or be an alternative to them, but these firm-level contracts cover a much smaller fraction of the workforce.[12] Despite the relatively high degree of centralization of industrial relations compared to the US and the transitional countries, there are substantial differences between the continental Western European regimes. Since *Calmfors and Driffill* (1988) much attention has been paid to the centralization and the coordination dimensions of the regimes. According to the Calmfors-Driffill hypothesis, bargained wages are the highest and macroeconomic outcomes are the worst under intermediate degrees of centralization, which in most cases refer to sectoral bargaining. On the other hand, both decentralized and centralized bargaining produce lower wages and better macroeconomic outcomes.[13] However, in many countries (e.g. Portugal and the Netherlands) there is multiple-level bargaining with coexisting bargaining arrangements, and there is no theory to give guidance in such cases.

According to the ranking of *Calmfors and Driffill* (1988), Austria, Norway and Sweden are the most centralized countries, and the UK, US and Canada are at the other extreme of the scale, while Germany and the Netherlands lie in-between. According to the OECD's ranking (*OECD*, 2004, p.151, Table 3.5) covering the period of 1995–2000, Norway is the most centralized country with the highest level of coordination, followed by Portugal with similarly high centralization and coordination scores. Austria, Germany and the Netherlands are considered to be medium centralized countries with predominantly industry-level bargaining and a high level of coordination. Spain and Sweden are medium centralized with a medium degree of coordination, while Italy is considered to be decentralized with a high degree of coordination. Transitional countries lie at the low end of both the centralization and the coordination scale:[14] fragmented firm-level contracts constitute the most important channel of collective negotiations, and the thin layer of sectoral agreements cover only a fraction of the employees. Due to the small coverage of industrial

10 Despite the minimum wage increases, there would be scope for wage agreements to regulate other aspects of the salary system. However, as highlighted by case studies (e.g. *Fodor, Nacsa and Neumann*, 2008), wage agreements in most cases specify only minimum and guaranteed wages and average wage increases.

11 Note, however, that there are important differences between the institutions of the Anglo-Saxon and transitional countries. For example, trade unions have different historical backgrounds, and the process of negotiation, the relevance of individual membership (whether individual-level or firm-level coverage is relevant) is also different (in the Anglo-Saxon countries firm-level collective contracts cover only member employees). *DiNardo and Lee* (2004) gives a detailed overview of the process of collective negotiation in the US.

12 For example, in Spain, 15 percent of workers was covered by firm-specific contracts in 1991 (*Card and de la Rica*, 2006), and in Portugal, the coverage of firm-specific contracts was less than 10 percent in 2000 (*Cardoso and Portugal*, 2005).

13 When the bargaining is decentralized, which usually corresponds to enterprise level bargaining, unions' wage demands are suppressed by market forces (unable to increase firm's cost level above that of competitors), while under centralized bargaining the wage demands are mitigated by internalizing the various negative externalities (e.g. higher consumer or input prices, unemployment externalities). (*Calmfors and Driffill*, 1988)

14 An exception is Slovakia, which is classified as having a modestly centralized and coordinated institutional structure due to the more important role of sectoral agreements.

agreements and their weak regulatory power, we only investigate the wage impact of firm-level (single- or multi-employer) collective contracts in Hungary.[15]

The empirical findings of the few quantitative studies from Hungary document modest or statistically insignificant wage impacts. *Neumann* (2001) using Hungarian data from 1998 finds a statistically significant wage impact of 5.6 percent in the case of firm-level collective agreements. *Kertesi and Köllő* (2003) analyzing the interaction of market concentration and unionization on the same dataset from 1998 concludes that industrial rents in highly concentrated industries are grabbed by unions, which leads to higher wages in those sectors. *Iga et al.* (2009) uses three transitional datasets, Hungarian and Czech data from 2002 and Polish data from 2004 to estimate the impact of firm-level and industry-level collective agreements. On average, using the cross-sectional data, they do not find a significant wage impact in any of the countries. In Hungary, firm-level collective agreements are found to be associated with 5–7 percent higher wages in those firms which were set up prior to or a few years after the transition. Compared to the above discussed papers, the current study is the first analysis which uses panel data. Therefore, it is the first study, which is able to take into account in the regression analysis both observable and time-invariant unobservable factors, which may influence wages.

Data

Data for the analysis come from two sources. We use the Hungarian Wage and Employment Survey (WES) linked to various workplace characteristics, while data on collective and wage agreements are recorded by the Ministry of Social Affairs and Labour. Our analysis covers the period of 1992–2008. The linked WES database is representative, and provides various information on the workers (wage, gender, age, highest level of education defined by five educational categories, 4 digit occupational code) and also workplace characteristics (balance sheet information, 2-digit industry classification, location, ownership structure, number of employees). The database covers all tax-paying legal entities with double-sided balance sheets that employ at least 20 employees.[16] Within firms, employees are sampled: on average, 6.5 percent of production workers and 10 percent of non-production workers entered into the sample. The database follows firms over time, thus, we have the opportunity to take into account time invariant unobserved firm-level heterogeneities in the regression analysis.

Data on collective and wage agreements are registered and maintained by the Ministry of Social Affairs and Labour.[17] The registration of wage agreements commenced in 1992. Since 1998, the Ministry extended the data collection to all collective contracts. The problem with both the wage and the collective agreement records is that though registration is compulsory, there is no sanctioning in the case of unreported records. Therefore, the number of reported agreements may be biased. On the one hand, existing, but non-reported agree-

15 Multi-employer collective contracts are usually contracts of enterprises having common ownership. Thus, they can be considered as being closer to the company-level contracts (*Neumann*, 2006b). In the current study we define both single- and multi-employer contracts as firm-level collective contracts.

16 Starting from 1995, the data collection was extended to (the sample of) firms with at least 10 workers, and from 1999 on to micro-firms as well.

17 The database on collective agreements are available on the Ministry's webpage.

ments bias the institutional statistics downward. On the other hand, expired agreements may bias the institutional statistics upward if the expiration of the contract was not reported to the Ministry. As wage agreements are negotiated yearly, wage agreement records may be biased mostly downward. However, in the case of the collective agreement records, bias in both directions may be possible, as in many cases the duration of the collective contract is indefinite with no expiration date.[18] The database includes information on the start and the end date of the agreements. In the case of the wage agreements, only the start date is important as their expiration is one year. However, the duration of collective contracts is mostly indefinite unless the expiration date is exactly specified.

The database was restricted to firms employing at least 20 employees. First, union coverage is very low in small firms. Besides, dropping smaller firms also eliminates the changes in the sampling of the database over time. As a next step, we examined the coverage of firms in the different industry categories: coverage ranges from zero coverage to 77 percent through the different 2-digit NACE categories. To get rid of categories with very low coverage, we dropped those industry categories where less than 5 percent of the employees are covered by a collective agreement. The final database includes information on 17,783 firms with 1,493,331 employee-year observations.

Table 1.1: Yearly number of collective and wage agreements, coverage of firms and employees in the database used for the analysis (after the cleaning and the sample selection procedures)

	Collective agreement			Wage agreement		
Year	# agreements	firms covered (%)	employees covered (%)	# agreements	firms covered (%)	employees covered (%)
1992	17	0.4	0.6	6	0.1	0.2
1993	108	2.2	4.2	63	1.3	1.8
1994	292	5.6	16.5	129	2.5	5.9
1995	378	6.6	18.9	102	1.8	3.6
1996	491	8.8	20.1	141	2.5	4.9
1997	669	11.8	25.6	204	3.6	6.6
1998	959	17.0	35.3	473	8.4	19.3
1999	969	16.2	35.5	458	7.6	23.8
2000	995	14.6	34.0	513	7.5	19.7
2001	945	13.7	28.9	438	6.3	13.6
2002	885	18.4	39.0	461	9.6	19.4
2003	859	18.6	41.8	451	9.7	23.3
2004	874	16.9	36.3	485	9.4	25.3
2005	846	16.3	33.4	344	6.6	14.7
2006	763	15.7	32.4	199	4.1	10.6
2007	709	15.1	30.7	72	1.5	3.0
2008	696	14.8	27.1	62	1.3	2.5
1992–2008	11,455	12.5	27.1	4,601	4.9	11.7

18 The problem of upward bias (expired contracts when the expiration is not reported to the Ministry) is mitigated by the careful monitoring activity of the Ministry. Besides, the linked employer-employee database includes only existing firms, therefore, agreements of non-existing companies do not bias the institutional statistics.

Table 1.1 presents the yearly number of firms with collective contract and coverage in the union and non-union categories. Regarding the collective agreement variable, on average, through 1992–2008, the coverage of firms was 12.5 percent, while the coverage of employees was 27 percent. Firms' coverage peaked in 2003 reaching 18.6 percent. From 2003 onwards, the coverage of collective agreements decreased, and in 2008 the coverage of firms was 14.8, while the coverage of employees was 27 percent. In the case of the wage agreement records the statistics are as follows. On average, the coverage of firms through 1992–2008 was 4.9 percent, and the coverage of employees 11.7 percent. Firms' coverage reached its highest value of 9.7 percent in 2003, which dropped to a low level of 1–2 percent by 2007–2008.

Estimation method

The union – non-union wage gap is estimated using individual earning functions. First, we compute the difference in average wages between the two groups of firms (union and non-union firms), termed as the raw union wage gap (*first specification*). However, the raw wage gap may be biased by several factors (e.g. the educational level, the occupation of the employee or the industry classification, ownership structure of the company), which can be controlled for using the linked database. It may happen, for example, that firms having a collective agreement have a more advantageous employee composition, e.g. employ more employees with a higher education level than firms without a collective agreement. In this case, the raw union wage gap also incorporates the higher return to education. The descriptive statistics outlined in the previous Institutional setting section also highlight the fact that firms are not randomly assigned to the union and non-union group: firms with a collective agreement are systematically larger, and are concentrated in certain industries.

After computing the raw wage gap, we estimate the union wage premium[19] taking into account several factors, which may influence the wages. The equations are estimated including controls step by step. In the *second specification* we control for employee characteristics (gender, educational level, age, occupation), while in the *third specification* observable firm variables (size, industry, region, ownership structure of the firm) are also included.

Additionally, the Hungarian linked database provides the opportunity to follow firms over time. Therefore, we can take into account unobservable firm fixed effects (*fourth specification*). Firm fixed effects are time invariant variables, which cannot be observed by the researcher, e.g. managerial efficiency, quality of capital, profit opportunities, organizational structure of the firm, work conditions, location of the firm (e.g. being close to highway, airport), etc. Omitting firm fixed effects among the control variables may bias upward or downward the estimated union wage gap. In the event that firms with a collective agreement are systematically "better" along these unobservable factors,

19 The terms wage gap, wage advantage, wage premium are used as synonyms in the study.

the union wage gap taking into account only observable controls also incorporates the positive impact of firm fixed effects, thus, it will be biased upward.[20]

In the *fourth specification* we take into account observable employee and firm characteristics, as well as time invariant firm fixed effects.[21]

The Hungarian data offers the opportunity to use the collective and/or the wage agreement dummy variables to assess the power of unions.[22] There are several arguments in favor of applying any of the contract dummies. For example, the wage agreement dummy variable is probably downward biased, while the collective agreement variable is less likely to be downward biased, but might be upward biased as well. In principle, wage premium could be attributed only to firms having wage agreement. On the other hand, it is possible that the mere presence of a trade union and its ability to represent the employees and to sign a collective agreement is enough to secure a positive wage premium. In this case union power is better captured by using the collective agreement dummy.

Furthermore, another interesting question is to analyze if signing a wage agreement in firms having an existing collective contract ensures a positive wage premium on top of the collective agreement premium. To assess the above questions, we estimate the wage equation in all four specifications (raw wage gap, including observable employee characteristics, including observable employee and firm characteristics, including firm fixed effects) using first only the collective agreement dummy. In this case the wage gap measures the wage differential between firms with and without a collective agreement. Next, we use only the wage agreement dummy variable, and measure the wage gap between firms having wage agreement and not having any kind of collective agreement.[23] Finally, both agreement variables are jointly included in the analysis to assess the question if signing only a collective contract (without a wage agreement) leads to higher wages, and if additionally a wage agreement (on the top of the collective contract) could secure even higher wages.

Estimation results

Table 1.2 summarizes the estimated average union wage gap for the period of 1992–2008 in all four specifications using the various agreement dummy variables.

The raw wage gap is remarkably large: firms with collective agreement pay, on average, 23 percent higher wages than firms without collective agreement, and the estimated value for firms with wage agreement is 26 percent.[24] The raw wage gap decreases slightly when controlling for employee characteristics (gender, education, occupation, age): the wage gap after taking into account individual controls is 19–22 percent. Observable firm characteristics are responsible for a substantial drop of the wage premium, which decreases by 70 percent to a value of 5–7 percent in the third specification. Thus, after filtering out the impact of observable variables, the wage advantage of a col-

20 The size and the direction of the bias depends on the correlation of the firm fixed effects with the union dummy and with the dependent variable. In the case when both correlations are positive (firms with collective agreement are systematically "better" e.g. due to the more efficient managerial activity, and "better" firms pay higher wages to the employees), then the specification taking into account only observable controls will be upward biased.

21 The econometric specification of the estimated individual earning equation can be found in the Appendix.

22 The collective agreement (wage agreement) dummy variable takes the value of 1 in year *t* if the firm had a collective (wage) agreement in that year. The value of the collective (wage) agreement dummy is 0 if the firm did not have a collective (wage) contract in that year.

23 In this case (if the union presence is captured by the wage agreement dummy), firms having only a collective agreement (without a wage agreement) are left out of the analysis. Including these firms would result in a mixed comparison group of having no collective agreement and only collective agreement. Thus, the wage gap would be composed of the wage agreement – no wage agreement gap and the wage agreement – collective agreement gap. In this way, we omit 5,615 firm-years out of the 81,497 firm-year observations.

24 We estimate the union wage gap using individual earning equation having the natural logarithm of individual wages as the dependent variable. Therefore, the estimated union wage gap is the difference in log wages, which is an approximation of the percentage wage differential (if the gap is sufficiently low).

lective agreement is much smaller than the raw wage gap. The considerably high wages (23–26 percent higher wages in firms with a collective agreement) can be, in large part, explained by various firm-level factors, which may influence wages, e.g. the size or the industrial classification of the firm. Including firm fixed effects further decreases the gap: in the final specification the wage premium of a collective agreement drops to 2.6, while the gap of wage agreements falls to 3.5 percent.

Table 1.2: Average union wage gap estimates using individual wage equations, 1992–2008

	Raw wage gap	+ observable individual controls	+ observable firm controls	+ firm-FE
Including only *one type* of contract variable				
Collective agreement	0.227***	0.185***	0.0534***	0.0259***
	(0.0264)	(0.0192)	(0.0133)	(0.00944)
Observations	1,517,744	1,517,744	1,493,331	1,493,331
Wage agreement	0.262***	0.220***	0.0626***	0.0347***
	(0.0253)	(0.0212)	(0.0143)	(0.00913)
Observations	1,250,041	1,250,041	1,226,778	1,226,778
Including *both* contract variables				
Collective agreement	0.202***	0.161***	0.0353**	0.0208*
	(0.0318)	(0.0216)	(0.0179)	(0.0111)
Wage agreement	0.0574**	0.0572***	0.0440**	0.0101
	(0.0273)	(0.0205)	(0.0198)	(0.00631)
Observations	1,517,744	1,517,744	1,493,331	1,493,331

Dependent variable: log of individual's monthly gross wage specified as base salary, overtime pay, regular payments and 1/12th of the previous year's bonuses.

Notes: The above table shows the estimated parameters of the collective agreement (wage agreement) variable. All specifications include year dummies. Individual observable controls are as follows: gender, education (three categories), age (three categories), occupation (seven categories). Firm-level observable controls are as follows: ownership, size, industrial classification (19 categories), location (seven categories). Standard errors are shown in parentheses.

*** Significant at the 1% level; ** 5% level * 10% level.

Comparing the results over the various specifications (starting from the raw wage gap to the last specification including firm fixed effects) highlights the point that firms with a collective agreement are "better" than the average along both observable and unobservable characteristics. For example, contract firms are mostly large, they tend to have an advantageous location, therefore they can pay higher wages than smaller firms or those being located in a less advantageous region.[25] Or, as an illustration of the firm fixed effects, it is possible that employees in contract firms are more productive, more motivated workers. Therefore, firms with such employees can pay higher wages than firms employing less productive, less motivated workers.

25 The descriptive statistics also confirm that the coverage is larger among larger firms. For example, the database used in the study shows that more than 60 percent of firms employing more than 300 employees was covered by a collective contract, while the coverage was 5 percent in firms with 20–50 employees in 2000. In the same year, the coverage in the Budapest region exceeded 60 percent, while in the other counties it reached only 21–54 percent.

The union premium using the wage agreement dummy is somewhat higher than employing the collective agreement variable, though the difference between them is tiny. Comparing the results (using either the collective or the wage agreement dummy) suggests that both dummy variables are appropriate to describe the power of unions. Furthermore, the estimates are in line with the results obtained in the specifications, which jointly include the agreement variables. Including both the collective and the wage agreement variables into the earning equation can reveal if the wage advantage associated with the wage agreements exceeds the wage premium of collective agreements. The bottom panel of *Table 1.2* depicts the results of the joint specifications. Taking into account both observable and time invariant unobservable controls, the wage advantage associated with collective agreements is around 2 percent, and is not significantly different from the wage premium of wage agreements. Though in principle wage advantages are associated only with wage agreements, these results suggest that the mere presence of a trade union, which is able to conclude a collective agreement, is enough to secure higher wages even without signing a formal wage agreement.

Given the differences in the estimation method and the underlying institutional setting, the comparison of the Hungarian results to previously reported results from other countries is not straightforward. The modest wage premium found in the current study is comparable both to the estimates from continental Western Europe and to some US studies using company-level data. In one respect, the magnitude of the wage premium (2 percent) found in the final specification of the current study, and the pattern of the results across the specifications are similar to *Gürtzgen* (2006). The author using German linked employer-employee panel data documents that the 18–20 percent raw wage gap of firm-level contracts decreases by roughly 70 percent after including observable firm-level variables. In her final specification taking into account time invariant unobservable fixed effects, the wage premium reaches a maximum of 2 percent. The comparison of the current study to *Gürtzgen* (2006) is straightforward as the results are quantitatively close to each other, moreover, the estimation method and the institutional system also share some common elements.[26] However, there are different reasons behind the modest wage premium in the Hungarian and German case. *Gürtzgen* (2006) proposes as a possible explanation of her results it being the consequence of the highly corporatist system, which prevents unions to behave as "aggressive local rent seekers" (*Hartog et al*, 2002 p. 322). A similar argument applies to the Dutch case as well. *Hartog et al* (2002) using cross-sectional firm-level data finds insignificant wage advantage associated with firm-level agreements relative to the extended sectoral-level contracts.[27] The authors explain their results as probably being due to the characteristics of the Dutch labour market where different bargaining regimes coexist and are "embedded in a corporatist web"

26 *Gürtzgen* (2006) also uses linked employer-employee data, and estimates individual earning equation. However, the German database follows not only firms, but also individuals over time. Therefore, the author can take into account time invariant individual unobserved effects as well. Similarly to the Hungarian case, the collective agreement dummy is defined at the level of the firm, but her study also examines the impact of industrial contracts. In Germany, there are three regimes: the uncovered sector, and the sectors covered by industrial- or firm-level agreements.

27 Comparing the Dutch and the Hungarian case, there are institutional differences between the two countries, and the applied methodologies are also different in the papers. The Dutch study uses cross-sectional data, therefore, cannot control for unobservable firm fixed effects.

(p 320). In this environment, unions do not act as "aggressive local rent seekers" (p. 322). *Card and de la Rica* (2006) using Spanish cross-sectional data finds that firm-level collective agreements are associated with a 5–10 percent wage premium.[28] A possible interpretation of their results refers to the characteristics of firm-level and sectoral-level agreements. While sectoral-level agreements tend to flatten wages across skill groups, firm-level agreements provide a more flexible wage structure.[29]

Estimates from the Anglo-Saxon countries are usually higher than documented in continental Western Europe. The most cited number is that the mean union wage gap is 15 percent based on *Lewis* (1986)'s work. *Blanchflower and Bryson* (2004) and *Hirsch* (2003) document a somewhat higher wage premium of 18–20 percent. However, these studies are based on household surveys and use mostly individual controls as these databases provide only limited information on the firm of the employee. On the other hand, studies based on enterprise-level data (*Freeman and Kleiner*, 1990, *Lalonde, Marschke and Troske*, 1996, *DiNardo and Lee*, 2004) obtain minor or insignificant wage advantages associated with unionism. These authors interpret the contrast of their findings to previous literature as being the consequence of the methodological differences (individual vs. enterprise-level estimation, household survey vs. enterprise-level data, collective agreement statistics based on questionnaire vs. institutional statistics, scarce firm-level controls vs. rich firm-level information). Or, another likely reason behind the differing results is that the above mentioned enterprise-level studies analyze the labour market impact of recent unionization. Unionism in the US started to decline in the 80's due to the increased opposition of managers to unionization and due to the more frequent use of labour-saving technologies (*DiNardo and Lee*, 2004).

The Hungarian results of modest wage advantages associated with firm-level contracting are also comparable to the above US enterprise-level estimates. Not only are the magnitude of the estimates very similar, but one feature of the institutional setting is analogous: both of these studies assess the wage impact of firm-level coverage vs. no coverage. However, the underlying reasons behind the small wage impacts are again different. Though the institutional structure in both countries is decentralized, the US and Hungarian trade unions have historically different roots. While unionism in the US was traditionally a strong institution, Hungarian trade unions had to reorganize themselves following the regime change, and find their new roles in the new environment. In most cases, the attitude of these unions became dominated by the social inheritance (wide scope of flexibility for the employer, regulation of non-wage elements of the salary, holiday/recreation possibilities for members, etc.).

The present results based on the 1992–2008 linked employer-employee panel data are also in line with the previous cross-sectional Hungarian estimates. *Neumann* (2001) using the Wage and Employment Survey from 1998 and

28 The Spanish study, due to the universal extension of sectoral agreements, also examines the wage premium of firm-level collective agreements relative to the sectoral-level contracts.

29 The authors find that the wage premium of firm-level collective contracts is higher for skilled employees.

the Ministry's records of collective and wage agreements found a 5–6 percent wage premium as a result of firm-level wage agreements. His estimate is similar in magnitude to our result (6.26 percent) taking into account observable individual and firm-level characteristics. The study by *Iga et al.* (2009) using another database leads to a similar conclusion.[30] The authors found a 5–7 percent wage premium in those firms which were set up prior transition or in the early transitional years. Our study additionally suggests that taking into account unobservable firm-level characteristics further diminishes the wage gap. The panel estimates of the final specification imply that wages in contract firms are only slightly higher than in non-contract firms: the wage gap due to the existence of collective or wage agreements is a maximum of 2–3.5 percent.

Another interesting question deals with the impact of the minimum wage regulation. The statutory minimum wage was increased by 60 percent in 2001 compared to its level in 2000. As a consequence, firm-level wage agreements somewhat lost their importance, which is reflected in the diminishing number of recorded agreements.[31] To analyze the question, we define two periods: the first one covering the years 1992–2000 and the second one including the years 2001–2008, and interact the wage agreement dummy with the period dummies. In this way, we obtain separate estimates for the first and the second periods. Results are shown by *Table 1.3*.

Table 1.3: Union wage gap estimates by period using individual wage equations

	Observable individual and firm controls	+ firm-FE
1992–2000	0.0745***	0.0466***
	(0.0185)	(0.00793)
2001–2008	0.0522***	0.0210*
	(0.0160)	(0.0121)
Observations	1,226,778	1,226,778

Dependent variable: log of individual's monthly gross wage specified as base salary, overtime pay, regular payments and 1/12th of the previous year's bonuses.

Notes: The above table shows the estimated parameters of the interacted wage agreement variables. All specifications include year dummies. Individual observable controls are as follows: gender, education (three categories), age (three categories), occupation (seven categories). Firm-level observable controls are as follows: ownership, size, industrial classification (19 categories), location (seven categories). Standard errors are shown in parentheses.

*** Significant at the 1% level; ** 5% level * 10% level.

As expected, the results imply that the wage gap is somewhat larger in the first period. The specification taking into account only observable characteristics suggests that the wage advantage due to firm-level wage agreements is 7.5 percent in the first period, and the estimated parameter is somewhat smaller, 5.2 percent after 2000. The gap further diminishes when including unobservable firm fixed effects: the wage premium is 4.7 percent in the first period and

30 *Iga et al.* (2009) uses the European Structure of Earnings Survey from 2002, which includes agreement records from other sources.

31 The statutory minimum wage was increased substantially for the first time in 2001. Starting from 2006, the government introduced a three-tier minimum wage system, in which the guaranteed minimum wages differ by education. Due to these regulations, the number of wage agreements dropped significantly in recent years, especially after 2005. According to the Ministry's records, the number of reported wage agreements dropped to 267 in 2007 and further to 185 in 2009.

drops to 2.1 percent in the second period. Thus, the specifications, which estimate separate parameters for the periods before and after 2000 imply that the importance of firm-level trade unions decreases over time. The change in the national minimum wage regulation probably played a large role behind the diminishing power of firm-level trade unions. Note, however, that it is also possible that the less important role of trade unions is partly due to a general trend (mostly experienced in the US), which emphasizes individual bargaining, individually set wages and flexible job arrangements.

As a summary, we can conclude that the wage premium of firm-level collective contracting is modest in Hungary. This is in line with expectations based on the decentralized, fragmented institutional structure. In our analysis estimating individual wage equation and using the institutional records of collective agreements, we found on average 2–3.5 percent wage gap for the period of 1992–2008 due to firm-level collective agreements. The raw wage gap is mostly explained by observable firm characteristics, but including unobservable firm fixed effects further reduces the gap. This last specification suggests that firms with a collective agreement are "better" (along unobservable characteristics) than the average.

The estimated parameters are similar to the ones obtained in previous studies using data from continental Western Europe, and to US enterprise-level estimates. Nevertheless, the underlying reasons behind the modest wage impacts are different. In continental Western Europe the explanations mostly refer to the corporatist, centralized and coordinated social dialogue. In the US the general declining importance of trade unions is the main reason. On the other hand, in Hungary trade unions could not overcome the social heritage and did not function as "classical" trade unions aiming to ensure the "automatic solidarity" between the employees. The attitudes of employees, employers and trade unions are largely affected by the characteristics of the previous regime: ensuring flexibility for the firm's management, and regulating mostly the non-wage elements. Analyzing the role of trade unions in the regulation of non-wage elements could be the topic of future research.

APPENDIX

The estimated individual wage equation

We estimate the following wage equation:

$$\ln W_{ijt} = \alpha U_{jt} + \gamma \Gamma + \varepsilon_{ijt}, \text{ where } \Gamma = (X_{ijt}, Z_{jt}), \varepsilon_{ijt} = v_j + \eta_{ijt} \text{ and } \eta_{ijt} \sim N(0, \sigma_\eta).$$

W_{ijt} shows the gross wage of the individual: the gross monthly wage of individual i employed by the firm j at time t. On the right hand side, U_{jt} is the collective agreement (wage agreement) dummy variable, which takes the value of 1 if firm j had a collective contract (wage agreement) at time t. In our study we

aim to estimate the α parameter of the U contract dummy. The estimated α parameter quantifies the union power. The matrix $\Gamma = (X_{ijt}, Z_{jt})$ includes further control variables. X_{ijt} summarizes the individual regressors (gender, education level, age, occupation of the employee), and Z_{jt} includes the firm-level controls (size of the company, industrial classification, location, ownership). The error term $\varepsilon_{ijt} = \upsilon_j + \eta_{ijt}$ is composed of a firm fixed effect υ_j and a random noise component $\eta_{ijt} \sim N(0, \sigma_\eta)$. All specifications include year dummies.

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2. THE EFFECT OF FOREIGN ACQUISITIONS ON WORKER WAGES*

JOHN S. EARLE & ÁLMOS TELEGDY

Introduction

This chapter analyzes a question that has been the subject of controversy in the context of both policy and research: the benefits and costs of foreign versus domestic ownership. Indeed, the posture of economic policy towards foreign direct investment (FDI), particularly cases of foreign acquisitions, seems to display a certain degree of ambivalence in many countries. On the one hand, FDI is valued as a source of finance, jobs, and technologies, and governments frequently compete for the favor of investors by offering special preferences and tax abatements. On the other hand, most countries completely prohibit majority foreign ownership in so-called "strategic" sectors – for instance, airlines and (until recently) banking in the US – and they often impose additional regulatory burdens and uncertainties that add to the inherently higher costs of sending capital and monitoring managers across national boundaries. These policies are frequently abetted by public fears of globalization, and a major issue in the debates is the effects of foreign ownership on workers and their wages.

Research on wages and FDI has examined a number of countries and used several types of data, and it has consistently documented a raw wage differential in favor of foreign ownership. A major issue in this research, however, is that FDI may be selective, "cream-skimming" or "cherry-picking" the best domestic firms for acquisition and the best areas and industries for greenfield start-ups. Studies using firm-level data and corrections for this selection bias found that the foreign wage premium survives, but it diminishes in magnitude (e.g., *Conyon et al.* 2002; *Girma and Görg*, 2007). The firm-level data, of course, typically contain little or no information on individual worker wages and characteristics, which makes it difficult or impossible to control for, and analyze, employee composition and relative wages by characteristics of workers within firms. Studies of worker-level data with information on employer ownership can address these issues, but they generally contain no controls for firm selection into ownership type or much employer information, which could be useful for disentangling the possible mechanisms underlying an FDI-wage correlation.

The advantages of both firm- and worker-level data can be exploited only with linked employer-employee data (LEED), and recently there have been several such studies (e.g., *Heyman et al.* 2007; *Huttunen*, 2007). These studies typically conclude that the causal effect of foreign ownership is small or it totally disappears.

* This study is based on *Earle, Telegdy and Antal* (2012). We thank *László Tőkés* for excellent research assistance.

In this chapter we estimate the impact of foreign acquisitions on the level and structure of wages in Hungary, an economy that rapidly reformed and liberalized inward investment during the 1990s. The data we analyze begin in 1986 when the centrally planned regime completely prohibited foreign involvement, they continue through the adoption of a very liberal regulation of FDI in which – despite significant opposition – the government awarded special treatment to many foreign investors, and they end in 2008, several years after accession to the European Union. The result of liberalization was ownership transfer from domestic to foreign owners that took place not only quickly but also broadly across nearly all sectors. At the same time, the tightly controlled wages of the centrally planned systems were abruptly liberalized, permitting organizations to set their own wages and to increase skill differentials, which had tended to be compressed under socialism (e.g., *Kornai*, 1990). We focus on acquisitions both because of their particular interest in the political economy of FDI (greenfield investments tend to be less controversial) and because of the better possibilities of controlling for selection of firms into foreign ownership, a common problem that biases the estimated effects of foreign ownership.

Data Sources and Sample Selection

We analyze data from two sources. The first is the National Tax Authority in Hungary, which provides balance sheet data for all legal entities engaged in double-entry bookkeeping. These data are available annually from 1992 to 2008 for all firms and from 1986 to 1991 for a sample of disproportionately large enterprises. The firm-level data files include the balance sheet and income statement, the proportion of share capital held by different types of owners, and some basic variables, such as employment, location and industrial branch of the firm.

The second source is the Hungarian Wage Survey, which has information on workers' earnings and characteristics every three years between 1986 and 1992, and on an annual basis ever since. The Wage Survey data provide extensive information on employees' earnings, their highest level of education, gender, age, occupation, whether the worker is a new hire and also working hours in some years. In 1986 and 1989 the survey covered all firms. At the start of the transition the sample design was changed to having only firms with more than 20 employees, which was gradually reduced to 5. In 1986 and 1989, workers were selected from narrowly defined occupational and earnings groups within firms randomly (managers were all included in the survey). From 1992 onwards the sample design changed; production workers were selected if born on the 5th or 15th of any month, while non-production workers were chosen if born on the 5th, 15th, or 25th of any month. Therefore, even though the target group of the survey was the population of firms above 20 employees, if a firm did not have any employees born on the given days in a particular year, the firm-year is miss-

ing from the data. This design was maintained for the firms with at least 20 employees by 2001, and for firms with employment above 50 thereafter, but for the smaller firms all employees' information was required. The data provide the number of production and non-production workers which we use to weight up the sample to the firm level employment. With the help of the firm level data we also construct a firm weight which adjusts the sample to the total number of employees in the relevant sectors of the Hungarian economy.

These data are linked to the firm-level data to form a linked employer-employee dataset (LEED), which is a panel in firms but not in individuals. Nonetheless, relying on individual information we linked 44 percent of observed employees that do not change their workplace from one year to the next. Although we cannot identify the effect of ownership change from workers who move between domestic and foreign firms, we can control for unobserved worker heterogeneity in the case of employees that stay with the same firm during a foreign acquisition or divestment.

We restrict our attention to full-time employees only, and we focus our attention to individuals between the age of 15 and 74. The final dataset is composed of 1.9 million firm-year observations on 377 thousand unique firms, to 33 thousand of which we link employee information resulting in a LEED of 2.5 million worker-years.

Ownership Evolution and Summary Statistics

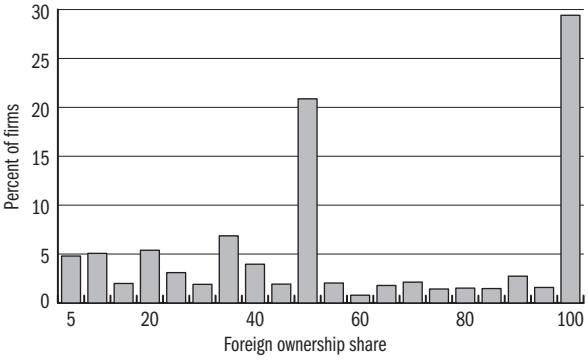
Hungary got off to an early start in corporate control changes with gradual decentralization and increased autonomy provided to state-owned enterprises during the late 1980s (*Szakadát*, 1993). The first foreign acquisitions had already taken place in 1989, the most well-known being the privatization of the lighting company Tungsram, bought up by General Electric. In the early 1990s not only were constraints on foreign investment drastically eased, but tax and other preferences for foreign investors were also provided (*OECD,* 2000). By the mid-1990s, Hungary had the highest value of foreign direct investment per capita among the post-socialist countries.

The share distribution of foreign ownership after acquisitions in 2000 is shown in *Figure 2.1*.[1] Almost one-third of the firms with positive foreign ownership are fully foreign-owned and 20 percent possess exactly 50 percent of the company's shares. The other firms are distributed roughly equally around all possible ownership stakes. The evolution of the foreign acquisitions (defined as an increase in foreign ownership above 50 percent), as well as the total employment of these firms is presented in *Figure 2.2*, which clearly reflects the early start and the importance of foreign acquisitions in shaping Hungarian corporate ownership. The proportion of foreign acquisitions had already started to increase at the beginning of the 90s and quickly reached 3 percent, their aggregate employment raising to about 15 percent of all employment in the

1 Except for several years at the beginning of the time period observed in the data, the share distribution of foreign ownership is very similar to the one presented here.

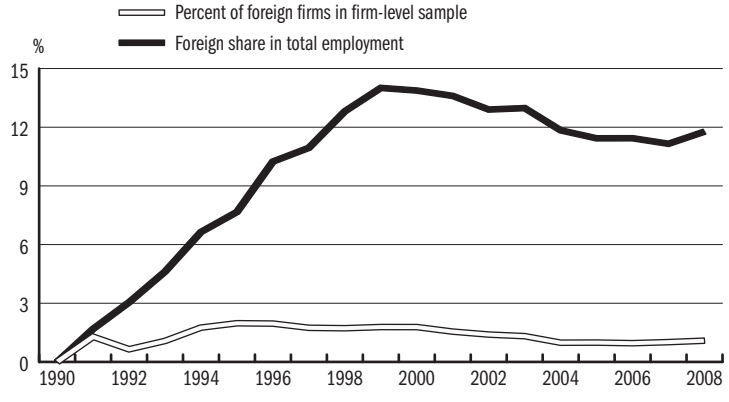
firm-level data by 1999. After this year their share in employment fell but nevertheless remained as high as 12 percent.

Figure 2.1: Distribution of foreign ownership share in 2000



Notes: $N = 4{,}418$ firms. Only firms with positive foreign ownership share included.

Figure 2.2: Evolution of foreign acquisitions

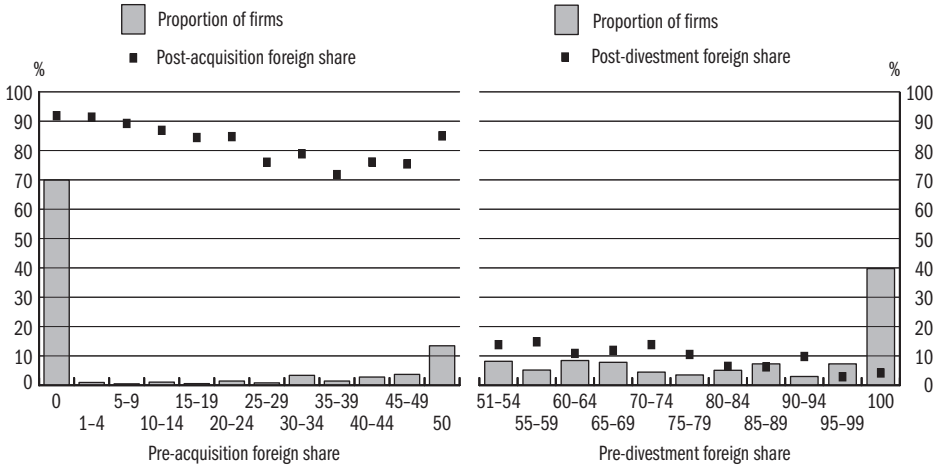


Notes: $N = 1{,}881{,}279$ firm-years in the firm data, 2,475,478 worker-years in the LEED.

According to the definition we use in our analysis, the only condition a firm has to satisfy to be a foreign acquisition or divestment is passing the 50 percent ownership threshold, but firms may differ in the starting and ending proportions of foreign ownership. We look at the foreign share distribution in such firms to understand the typical patterns of ownership change: does the foreign ownership stake change only several percentage points around the 50 percent threshold or do foreigners rather buy and sell large proportions of capital in such firms? We analyze the foreign ownership stakes before and after acquisitions and divestments in *Figure 2.3*. The bars show the distribution of firms by the pre-acquisition (divestment) foreign ownership

share, and the diamonds show the mean share of foreign ownership after the change had taken place. The pre-acquisition share information reveals that 70 percent of the target firms had no foreign ownership. One-fifth of all firms had 50 percent foreign ownership before the acquisition while the remaining 10 percent of firms are distributed roughly equally across other proportions of pre-acquisition foreign ownership. After the foreign takeover, the foreign ownership share is very high, reaching 80 percent on average. Pre-divestment foreign ownership is also concentrated at 100 percent, but less than half of the firms are exclusively owned by foreigners, the others being quite equally distributed around across the whole distribution between 50 and 100 percent. The average foreign ownership stake after the divestment is only about 10 percent, documenting that after divestment foreigners did not retain much of a stake in the firm. Therefore, both foreign acquisitions and divestments result in extreme changes in foreign ownership.

Figure 2.3: Distribution of foreign ownership before and after foreign acquisitions and divestments



Notes: $N = 4{,}928$ acquisitions, 983 divestments. Bars depict the distribution of acquired (left panel) and of subsequently divested (right panel) firms according to size of foreign ownership share in the last domestic year (for acquisitions), or in the last foreign year (for divestments) before the change in majority ownership. Diamonds depict the average foreign share in the first foreign year (for acquisitions), or in the first domestic year (for divestments) after the change in majority ownership.

As most of the previous studies, in the firm data we use the firm-level average wage, defined as the total payments to workers over the average number of employees. Wages are deflated by yearly CPI and are measured in 2008 Hungarian forints. The first row of *Table 2.1* shows that unconditional mean wages are twice as large in foreign-owned firms as in domestic enterprises.

Table 2.1: Firm characteristics of the sample

	ALDO	FOAQ
Average Annual Wage Bill per Worker	1,083.6	2,052.9
	(1,829.4)	(2,634.0)
Tangible Assets	142.1	2,094.6
	(4,803.9)	(30,214.6)
Employment	22.4	119.3
	(366.3)	(651.0)
Labor Productivity	23.0	62.5
	(171.4)	(928.5)
N	1,835,371	47,972
Industry in 2000		
Agriculture, Hunting, Fishing, Forestry	5.0	2.8
Mining, Electricity, Gas, Water Supply	0.6	1.2
Manufacturing	17.3	26.2
Construction	10.2	3.4
Wholesale, Retail Trade, Repair	31.2	36.1
Finance, Insurance, Real Estate	5.2	7.0
Business Services	19.4	12.0
Other Services	11.2	11.3
N (firm-years)	90,171	3,055

Notes: Average earnings measured in thousands, tangible assets and labor productivity in millions of 2008 HUF. Standard deviations in parentheses.

Table 2.2: Individual characteristics by ownership type – LEED

	Domestic	Foreign
Monthly Earnings	137.3	237.2
	(120.9)	(247.6)
Female	38.1	42.4
Education		
Elementary	27.1	16.9
Vocational	33.9	28.7
High school	30.2	36.0
University	8.8	18.4
Experience	22.7	21.6
	(11.0)	(10.8)
New Hire	11.2	10.2
Occupation		
Elementary Occupations	10.1	5.0
Skilled Manual Workers	46.8	46.0
Service Workers	10.3	6.9
Clerks	7.5	6.2
Associate Professionals	12.7	18.2
Professionals	4.1	8.7
Managers	8.6	9.0
N (worker-years)	2,344,622	142,433

Notes: Earnings measured in thousands of 2008 HUF. Standard deviations in parentheses.

The LEED have information on individual wages paid in May. They include the monthly base wage, overtime pay, regular payments other than the base wage (e.g., language and managerial allowances), and $1/12^{th}$ of the previous year's irregular payments (such as end-of-year bonuses). If the worker was hired during the previous year, we divide the last wage component by the number of months the worker spent with the company in that year. *Table 2.2* shows that by this measure the wage premium in firms acquired is similar to the figure in the firm level data.

In addition to wages, *Table 2.2* also presents the characteristics of firms while *Table 2.3* provides the descriptive statistics for worker characteristics. Measured by the value of tangible assets or employment, foreign firms are much larger and they are also much more productive (as measured by labor productivity, the value of sales over the average number of employees). The industrial composition of foreign and domestic firms also differs substantially. Relative to domestic firms, foreign-owned firms predominate in manufacturing, and they are less prevalent in agriculture, construction and business services.

The average characteristics of workers also vary by ownership type. Foreign owners employ a higher proportion of female workers and university graduates; vocational and high school graduates are in similar proportions employed in domestic and foreign companies and those with only elementary education are more likely to be employed by domestic firms. Little difference exists in the length of work experience and the likeliness to be newly hired (defined as hired during the previous calendar year). The occupational distribution differs between foreign and domestic firms: the workforce in foreign-owned companies has a higher proportion of associate professionals and professionals, smaller proportions of workers in elementary occupations, service workers and clerks while the proportion of managers is the same across the two ownership types. Relative to domestic firms, therefore, workers in foreign companies tend to be more educated, somewhat less experienced, and more likely to be female and in professional and associate professional occupations. The firm and worker characteristics, of course, are simple unconditional means that take no account of any other characteristics of foreign and domestic companies, but they are suggestive of the underlying heterogeneity in the population.

Estimation Procedures

Our first firm-level estimating equation is the following:

$$\ln W_{jt} = a + \delta_f FOREIGN_{j,t-1} + \Sigma\gamma_j REGION_j + \Sigma\lambda_t YEAR_t + u_{jt}, \qquad (1)$$

where j indexes firms and t indexes time. $\ln W_{jt}$ is the natural logarithm of the wage bill per employee, and we control for year and regional effects. The regression is weighted by the number of employees in the firm-year. In some specifi-

cations we disaggregate *FOREIGN* into two types of foreign acquisitions: single acquisitions and acquisitions followed later by divestment (i.e. a domestic acquisition) after at least one year of foreign ownership.

To account for possible differences in workforce composition we use the LEED and control for gender and human capital:

$$\ln w_{ijt} = a + \beta_{it} X_{it} + \delta_f FOREIGN_{j,t-1} + \Sigma\gamma_j REGION_j + \Sigma\lambda_t YEAR_t + z_{ijt}. \quad (2)$$

X_i is a vector of individual characteristics including three educational dummies (*VOCATIONAL, HIGH SCHOOL*, and *UNIVERSITY*, the omitted category being at most 8 years of schooling), (potential) *EXPERIENCE* in level and squared, and a dummy variable for gender = 1 for female employees (*FEMALE*). As education and experience may be correlated, and gender may influence both, we include a full set of interactions among these variables.

There are good reasons to believe that the OLS estimates of the foreign ownership effects are biased: the owners of the acquiring firms are likely to select targets that have better growth prospects or a more skilled workforce, for example. If the firm characteristic upon which the selection is performed is not observed for the researcher, the estimated effect of ownership on wages will be biased. To attenuate this selection bias, we add firm fixed effects to the regression to control for all unobserved time invariant effects at the firm level. In addition, with the help of employee-level variables we link most workers who did not change their workplace from one year to any other (those who changed cannot be linked). This procedure resulted linking almost half of the workers across years. Having obtained the links, we can control for worker effects which takes out all the time-invariant variation from the data for those workers who do not change jobs. Note that these estimates identify the foreign effect from the sample of incumbent workers – those who had already been with the firm before the foreign acquisition took place.

The Effect of FDI on average wages and on the wage structure

Using Equations (1) and (2), we estimate the foreign effect with OLS, firm fixed effects and joint firm-worker effects. Simple OLS regressions (shown in *Table 2.3*) function as benchmarks for our attempts to distinguish selection bias from causal effects, and they provide measures of average wage differentials for firms by all ownership types. The estimated effect on the firm level data implies a 64 percent wage differential controlling only for region and year effects. The simple average FDI effect estimated with the LEED data is smaller, but still large at 46 percent.[2]

The LEED of course permits us to include worker characteristics and control for gender, education, potential experience and interactions between these variables. It is quite striking that the inclusion of these individual controls changes the estimated foreign effect only by 4 log points. The inclusion

2 The two datasets and the dependent variables are different, so it is not surprising that the estimates differ, but they both suggest that the foreign wage effect is positive and large in magnitude.

of firm fixed effects, on the other hand, reduces the coefficients in both samples by a large extent. The firm-level estimate falls to 0.27 and the individual estimate to 0.16.

Table 2.3: The effect of foreign acquisition on wages

	OLS no controls	OLS with controls	FFE	FWFE
Firm Data	0.636**	N.A.	0.270**	N.A.
	(0.041)		(0.024)	
LEED	0.463**	0.420**	0.158**	0.051**
	(0.038)	(0.025)	(0.016)	(0.012)

Notes: $N = 1{,}881{,}267$ firm-years in the firm data, 2,475,478 worker-years in the LEED. N.A. = Not applicable.

As the difference between the OLS and the fixed effects estimates are a measure of selection of target firms of acquisitions, the difference between the estimated coefficients suggests that this is quite large: the future foreign owners carefully select their targets from the high-wage domestic firms. As wages may reflect worker quality, it is likely that foreign acquired firms had a better than average workforce already before the acquisition took place. The further inclusion of worker-firm joint fixed effects further reduces the estimated foreign wage effect to 5 percent. This shows that even those workers, who were already employed with the target firm before the foreign acquisition, received a wage increase of 5 percent on average, relative to the non-acquired counterfactual.

The analysis so far treated all foreign firms equally and did not distinguish single acquisitions from those which were subsequently divested. In the regressions with a single foreign dummy variable we made the implicit assumption that the foreign wage effect is symmetric in both directions, but an interesting question is whether this assumption is correct. These specifications allow us to examine differences between firms that were kept in foreign ownership and those which were further divested to domestic entrepreneurs. In addition, by looking at those firms which experienced both acquisitions and divestments during the period observed, we can estimate the symmetry of the foreign wage effect for both acquisitions and divestments within firms, eliminating any fixed differences between acquisitions and divestments.

Table 2.4 presents these results. Single acquisitions are estimated to increase wages by 28 percent in the firm sample and by 17 percent in the individual sample. When the acquisition is followed by a divestment to Hungarian owners, the effect does not change much. When worker effects are controlled for (and thus the estimation is identified from incumbent workers), the effect is still of 5–8 percent. Thus, both types of acquisition lead to positive wage effects but do they persist if the firm is sold to a domestic owner? The estimations reveal that the reversal of the foreign effect is not complete, but nor is it small. The coefficient for divestments (relative to the initial domestic period) is always

smaller than the acquisition effect and the difference is quite large. For example, in the case of the firm sample, the coefficient on divestment is almost half as large as that of acquisitions. This analysis provides evidence, therefore, that a large part of the foreign wage effect indeed is associated with foreign ownership as it disappears when the foreign owners leave the company.

Table 2.4: The effect of foreign ownership by type of investment

	Firm level		LEED
	FFE	FFE	FWFE
Single Acquisitions			
Acquisition Effect	0.283**	0.169**	0.052**
	(0.031)	(0.020)	(0.016)
Domestic-Foreign-Domestic			
Acquisition Effect	0.298**	0.212**	0.083**
	(0.046)	(0.037)	(0.021)
Divestment Effect	0.164**	0.142**	0.051*
	(0.063)	(0.048)	(0.026)

Notes: See Table 2.3.

Our analysis has established a robust and positive average treatment effect of foreign ownership on wages, but we have not yet studied the effect on various worker groups. Are there some worker types which win, and some others which lose wages as a result of foreign ownership, or everybody benefits and receives a positive foreign wage premium? Foreign ownership is usually associated with high quality products and services, better technology and better corporate culture so one could hypothesize that workers with high levels of human capital get higher wages relative to their less endowed colleagues. To test this, we interact foreign ownership with worker characteristics and run the same regressions as before. In the first set of regressions we test how the foreign wage effect varies with gender, education and experience. *Table 2.5* shows that the wage effect of the reference group (male workers with elementary education and 10 to 20 years of experience) is 13 percent. The estimated effects of the interaction terms show that relative wages indeed change after a foreign acquisition: some of the estimated effects are negative while others larger than zero and their magnitude also varies. Nevertheless, the negative effects are never larger in magnitude than the main effect, showing that foreign ownership increases the wages of both genders, all types of education and experience groups, as well as new hires and workers with longer tenure. As expected, better education is associated with higher foreign wage effects and the wage premium declines with experience. The estimated wage differential across the two genders is small and statistically insignificant, while workers in their first year with the firm get smaller wages by 3 percent than before the acquisition.

Table 2.5: Effects of foreign acquisition on the wage structure by gender, education and experience groups

	FE	Standard error
Acquisition Effect of Reference Group	0.127**	0.021
Female	–0.011	0.011
Vocational	0.021*	0.010
High school	0.046**	0.013
University	0.238**	0.032
Experience: 0–10	–0.032**	0.009
Experience: 21–30	–0.015*	0.007
Experience: 30+	–0.009	0.010
New Hire	–0.033*	0.015

Notes: $N = 2{,}474{,}692$ worker-years. Reference group: Males with elementary education and 11–20 years of potential labor market experience, who are not new hires. Coefficients and standard errors from a regression where the acquisition dummy is interacted with individual characteristics.

The universal increase of wages is true for the occupational structure as well, as demonstrated by the estimated effects in *Table 2.6*, where we interact the foreign acquisition dummy with 1-digit occupational dummies: the estimated effects are all positive and almost always significant. The big winners of foreign ownership are managers and professionals, but occupations requiring lower skill levels are also associated with a 12–16 percent wage premium. The sole exception is the category comprising of service workers, who receive wages 9 percent higher than before the acquisition which is quite sizable economically, but this effect is statistically not significant.

Table 2.6: Effects of foreign acquisition on the wage structure by occupation

	FE	Standard error
Manager	0.474**	0.043
Professional	0.356**	0.043
Associate Professional	0.162**	0.022
Clerks	0.127**	0.021
Service	0.090	0.058
Skilled manual	0.121**	0.019
Unskilled	0.126**	0.022

Notes: $N = 2{,}474{,}692$ worker-years. Coefficients and standard errors from a regression where the acquisition dummy is interacted with occupational group dummies.

One possible objection to the analysis above concerns measurement error in the wage variable correlated with ownership. First, working hours may be different under domestic and private ownership. As the wage variable used in this analysis is the yearly average in the firm data and monthly in the LEED, we do not capture any variation in working hours. The post-1999 LEED, however, provide information on hours worked, and we use this to test for possible bi-

ases. We run similar regressions as before but with working hours as the dependent variable.[3] The estimated coefficients (not shown), are small and imprecisely estimated, showing that hours are probably not very different across ownership types.[4]

Second, wages can be biased due to under-reporting to decrease tax payments. The tax burden on employment is high in Hungary and tax avoidance is widely considered rife. If under-reporting is more prevalent in domestic firms, the estimated foreign effect may be upward biased. To check whether domestic firms are indeed more likely to avoid taxes than foreign-owned enterprises, we carry out two tests. First, we interact the foreign dummy with a cheating index which is defined at the industry level and shows the likeliness of cheating (*Elek et al.* 2009). Our results show that in industries where under-reporting is less likely, the foreign wage difference is larger than in cheating industries. This result rejects the hypothesis of domestic firms being less honest in terms of reporting true earnings, although it is also consistent with other differences across size and industry categories in how foreign firms operate. As a second test, we replace wages with a dependent variable indicating whether the worker was paid very close to the minimum wage that year (defined as being paid less than 3 percent more than the minimum wage). We find that a lower proportion of workers were paid the minimum wage in foreign-owned companies, and the estimated coefficient is significantly different from zero. This result may suggest more misreporting in domestic firms, but the magnitude of the coefficient is rather small (0.038–0.066). As only about 10 percent of workers receive the minimum wage in our sample, this wage differential cannot explain the large estimated foreign wage premium.[5]

To summarize, all of the analyses imply a positive, statistically significant wage effect of foreign acquisitions. The reversal of the FDI effect in cases where acquired firms are subsequently divested to domestic owners also suggests that the wage effect is genuine and not entirely the result of selection. The estimated FDI effect tends to be smaller in the LEED than in the firm-level data, but still higher than those estimated in other countries. But what is the economic mechanism which generates this premium?

We argue that a genuine wage effect of FDI implies a productivity differential across domestic and foreign firms. As we discussed in the introduction, high firm productivity is not sufficient to having higher wages if labor markets are competitive, but combined with different types of rent sharing can lead to it. Also, it is hard to imagine that an unproductive firm would pay higher wages, unless it has some rents to extract (for example, monopoly position). As the foreign firms from out data operate in various kinds of industries, it is unlikely that they all have some rents which they can share with workers. To examine the wage-productivity relationship, we estimate two specifications with the dependent variables being labor productivity (total sales divided by employment)

3 A more natural test would be the replacement of monthly wage with hourly wage in our regressions, but the wage variable includes several types of payments which do not vary directly with hours worked.

4 The measurement of working hours is probably noisy in the case of white collar workers. As a robustness test, we rerun the regressions with only blue collar workers, and obtained similar results.

5 This result can also be interpreted as another piece of evidence for the foreign wage premium.

and average compensation. By comparing the magnitudes of the two estimated coefficients, we can draw conclusions about the similarity of the productivity and wage effects. *Table 2.7* contains the results, which show a wage effect of 24 percent, similar to that which we obtained before. The labor productivity effect of foreign ownership is almost 38 percent, much larger than the wage effect. The difference in the two effects can be the result of the productivity effects of capital and the rents going to the owners of capital – the foreign investors. Indeed, when we control for capital and material costs per worker in Column 2 of the table, we find very similar wage and productivity effects: the foreign coefficient of the wage equation drops to 17 percent, while the labor productivity effect falls much more to 18 percent.

Table 2.7: The effect of acquisitions on labor productivity and average wages

	(1)	(2)
Average Compensation	0.241**	0.172**
	(0.002)	(0.002)
Labor Productivity	0.378**	0.179**
	(0.003)	(0.002)
Controls for Capital Intensity and Material Cost/Worker	No	Yes

Notes: $N = 1\,658\,584$ firms. Regressions are weighted by employment.

Why then are the productivity and wage effects of FDI in Hungary so high? One possibility is that Hungarian firms started the transition in a backward condition, technologically and organizationally far from the frontier, and thus it was relatively easy for foreign investors to raise productivity and wages. To examine this, we carry out further analysis. First, we collected data on the origin of the foreign owner by source country.[6] Our assumption is that owners from more developed countries are likely to bring more up-to-date technology and organizational capital and so increase labor productivity and subsequently wages.[7] We test this assumption by interacting the foreign ownership dummy with the proportional difference between the GDP *per capita* of the source country of FDI and the Hungarian figure.

We also test whether the wage effect varies with the timing of the foreign acquisition. Domestic firms were further away from their production possibilities frontier at the beginning of transition and wages were also smaller than in latter periods. Therefore, in early transition foreign owners had more space for improvement than later. As an additional test, we disaggregate the target firms by their ownership type into state and privately owned firms and test whether the foreign acquisition effect is different across the two types. Here the hypothesis is that state-owned firms are further from their production possibilities frontier so foreign ownership may have a larger effect on them.

In the top panel of *Table 2.8* we first show how the foreign wage effect varies by the grade of development of the sending country of FDI. The interac-

6 Foreign raiders are predominantly from continental European countries.

7 An alternative assumption is that those owners who are used to paying high wages are more likely to raise wages of Hungarian workers for equity reasons or for motivating them to exert more effort or not leave the firm.

tion term between the relative GDP per capita and the foreign acquisition dummy variable is positive and significant in both samples, showing that the foreign wage effect is higher for wealthier sending countries. Early and late acquisitions have similar estimated wage effects in the firm sample, but they do differ in the LEED. While those acquisitions which took place before 1998 raise wages by 30 percent, those which happened after this year have an effect of only 23.5 percent. The next test permits the FDI acquisition effect to vary between state-owned targets (i.e., privatizations) and those that are domestic private. Again, the estimated FDI effect is larger for the former firms, which were inherited from the central planning system, and therefore are likely to be farther from the productivity (and wage) frontiers. The heterogeneity of the wage effect by the ownership of the target firms is quite large in the firm level sample, where foreign ownership raises the average wage of domestic firms by 14, and for state owned firms by 35 percent.

Table 2.8: FDI impact estimates by source of country gdp, acquisition period, and target type

	Firm-Level	LEED
GDP per capita	0.055**	0.036**
	(0.005)	(0.004)
R^2	0.234	0.333
Early Acquisition	0.301**	0.208**
	(0.028)	(0.022)
Late Acquisition	0.235**	0.104**
	(0.090)	(0.017)
R^2	0.251	0.340
State-Owned	0.351**	0.202**
	(0.030)	(0.024)
Domestic Private	0.137**	0.120**
	(0.057)	(0.022)
R^2	0.254	0.340

Notes: In the first panel, $N = 1{,}786{,}859$ firm-years for firm-level sample and 2,430,840 worker-years for LEED; in the next two panels, $N = 1{,}804{,}481$ firm-years for firm-level sample and 2,474,692 worker-years for LEED. All specifications include year and region dummies, and firm fixed effects; in addition, we control for gender, education, experience and their full interactions in the LEED. GDP per capita measures the difference between the source countries' and the Hungarian GDP per capita, relative to Hungarian GDP per capita. All GDP values measured in 2000 US dollars. GDP data is from World Bank.

Conclusions

This paper investigated the effect of inward foreign direct investment on earnings in Hungary. We found that foreign ownership is correlated with higher earnings in a pooled OLS specification, and the wage premium is very large at 40–60 percent, even after controlling for various worker and job character-

istics. However, foreign owners "cherry-pick" high-wage domestic firms, as shown by the reduction of the foreign wage premium when we apply econometric methods that attenuate the selection bias. Nonetheless, even in these specifications, we still find a positive and strongly significant foreign wage effect of 16–27 percent, which is larger than that which most studies find for developed countries. We also find that the wage increase is universal across worker types: some benefit more than others such as high skilled, young workers, but all skill groups, occupations, and both genders experience a foreign wage premium. Those workers who were with the firm already before the acquisition are also estimated to enjoy increasing wages.

Regarding the underlying economic mechanism, we find that the wage premium is associated with the difference in the productivity across domestic and foreign-owned firms. This is underlined by the heterogeneity of the foreign wage effect, which shows that the wage effect is larger in the case of early acquisitions, when the target firm was owned by the state, and when the sending country's grade of development is high. These factors are all likely to be associated with the possibility of high productivity change after the foreign acquisition.

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3. PRIVATIZATION, EMPLOYMENT AND WAGES: EVIDENCE FROM HUNGARY IN COMPARATIVE PERSPECTIVE*

JOHN S. EARLE & ÁLMOS TELEGDY

Introduction

One the most controversial, yet least studied, issues in the economic transition of Hungary and indeed in any reforming economy concerns the impact on employees when their employers are privatized. While many commentators have simply assumed that employment would fall and perhaps wages would as well when new private owners strive for increased efficiency, there have been few careful estimates of these impacts, and essentially none outside of the manufacturing sector. This paper reports research estimating employment effects using firm-level data for Hungary and four other nearby economies (Lithuania, Romania, Russia, and Ukraine) and wage effects using linked worker-firm-level data for Hungary.

The Employment Effects of Privatization

The greatest opposition to privatizing a firm usually comes from the firm's own employees, fearful of job losses and wage cuts. Workers' apprehensions about privatization are consistent with standard economic analyses, whereby new private owners raise productivity and reduce costs in response to harder budget constraints and stronger profit-related incentives (e.g., *Boycko et al.* 1996; *Aghion and Blanchard*, 1998). However intuitive, the empirical basis for these results is remarkably slender, as there have been very few studies that have focused on the employment and wage effects of privatization, still fewer that have used appropriate micro-level databases, and essentially none that provide estimates outside manufacturing.[1]

Previous research on the consequences of privatization for workers has been hampered by small sample sizes, short time series, and difficulties in defining a comparison group of firms. The data limitations have not only reduced the generality of the results but also constrained the use of methods that could account for selection bias in the privatization process. In the first systematic study of the effects of privatization on employment and wages, for example, *Haskel and Szymanski* (1993) analyze 14 British publicly owned companies, of which four were privatized and the others were deregulated. *Bhaskar and Khan* (1995) use data for 1983 and 1988 to estimate employment effects in 62 Bangladeshi jute mills, half of which were privatized. *La Porta and Lopez-de-Silanes* (1999) analyze 170 privatized firms in Mexico, although the post-

* We thank *Eszter Nagy* and *László Tőkés* for excellent research assistance.

1 The relatively little research on employment and wage effects contrasts with the large literature on privatization and firm performance; see the surveys by *Megginson and Netter* (2001) and *Djankov and Murrell* (2002).

privatization information is limited to a single year. Other studies have sometimes included employment as one of several indicators of firm performance, but not the focus of analysis. Overall, the results from this small body of previous research are inconclusive, containing both negative and positive estimates of the effects on workers.

One partial exception to this characterization of previous research is *Brown et al*.'s (2010) study of manufacturing firm data through 2005 for Hungary, Romania, Russia, and Ukraine. In this paper, we build on and extend research on the employment effects of privatization, adding Lithuania, non-manufacturing firms, and additional years of information (to the extent available), as well as providing a focus on Hungary in comparison to the other economies. We also present employment-weighted estimates that allow us to draw inferences on the overall impact of privatization on numbers of employees, not just on firm-level behavior, and to assess variation in the effect of privatization with firm size. We follow earlier work on privatization (including *Brown et al*. 2006) in distinguishing domestic from foreign owners, post-privatization, and devoting attention to the important problem of selection bias, whereby firms of differential quality are selected to be privatized or to remain in state hands.

An analysis of Hungary in comparative perspective is of particular interest because it is frequently considered one of the most successful transition economies, and the other economies in our data cover the range for degree of success, at least as viewed by the conventional arbiters in the International Financial Institutions.[2] We study these economies using quite comprehensive data that include nearly the universe of firms inherited from central planning, both those eventually privatized and those remaining under state ownership. The total data set contains more than 70,000 firms (by comparison with the 30,000 in *Brown et al*. 2010), and the time series information runs from the Communist and immediate post-Communist period, when all were state-owned, through as late as 2009, well after most had been privatized. For each firm in each country, we have comparable annual information on average employment and ownership, the latter distinguishing foreign and domestic ownership types and allowing us to infer the precise year in which ownership change occurred.

Our aim is to provide consistent estimates of the employment effects of privatization for Hungary and the comparator economies using much larger samples and longer panels than were available to earlier researchers. The data provide comparison groups of state-owned firms operating in the same industries as those privatized, and the long time series permit us to apply econometric methods developed for dealing with selection bias in labor market program evaluations. We estimate regression models including not only firm fixed effects but also firm-specific time trends, which control not only for fixed differences among firms but also differing trend growth rates that may affect the

2 The *World Bank's* (1996) four-group classification of 26 transition economies, for example, puts Hungary in the first group of leading reformers, Romania in the second, Russia in the third, and Ukraine in the last. Similarly, the EBRD's annual indicators of "progress in transition" invariably place Hungary at or close to the top of all transition economies; according to overall "institutional performance" in *EBRD* (2000), Hungary is ranked first, with a score of 3.5, while Romania is awarded 2.3, Russia 1.9, and Ukraine 2.1.

probability of privatization and whether the new owners are domestic or foreign investors.

The substantial variation we find in the estimated employment effect of privatization in our data shows the importance of careful choice of econometric method. The most persuasive specifications, those that include firm fixed effects and particularly those that take into account firm-specific trends, however, show no evidence of large negative impacts of privatization on employment in Hungary or any of the other countries. Privatization to foreign owners is generally estimated to raise employment at a privatized firm, although these effects are strongest in Hungary, Russia, and Ukraine, and weakest in Lithuania and Romania. Weighted results show more variation, but again in the most convincing models including firm-specific trends there are no large, statistically significant, negative effects. The results thus contradict the simple expectation of many workers as well as many economists that privatized firms would reduce employment, but they are consistent with *Brown et al*.'s (2010) finding of a substantial "scale effect" whereby privatized firms expand output, to some extent offsetting employment losses from increased efficiency.

The next section describes our data for Hungary and the other four countries, and *Section 3* discusses their privatization programs. *Section 4* explains the estimation procedures, and *Section 5* presents the results. Conclusions are summarized in *Section 6*.

Data

Our analysis draws upon annual unbalanced panel data for most of the firms inherited from the socialist period in each of the five countries we study. The sources and variables are quite similar across countries, although the Hungarian and Romanian data tend to be more similar to each other than to those in the Soviet successor states. The basic data sources are the National Tax Authority in Hungary and the Ministry of Finance in Romania, which provide data for all legal entities engaged in double-sided bookkeeping. In addition, the Romanian data are supplemented by the National Institute for Statistics' enterprise registry and two datasets of the State Ownership Fund, describing its portfolio and the privatization transactions. The Hungarian data are available for 1986–2005 and the Romanian data for 1992–2006.

The State Committees for Statistics in Lithuania, Russia and Ukraine (*Statistikos Departamentas* in Lithuania, *Goskomstat* in Russia and *Derzhkomstat* in Ukraine) are the successors to the branches of the corresponding Soviet State Committee. They compile the basic databases for our analysis in these countries, the annual enterprise registries. These are supplemented by joint venture registries that are available in Russia and a database from the State Property Committee in Ukraine, which we have linked across years. The Lithuanian data cover the period of 1995–2006, the Russian 1985–2005 and the Ukrain-

ian 1989 and 1992–2006. The whole Russian and the early Ukrainian data (until 1996) are based on industrial registries which are supposed to include all industrial firms (manufacturing as well non-manufacturing) with more than 100 employees or more than 25 percent owned by the state and/or by legal entities themselves included in the registry. In fact, the practice seems to be that once firms enter the registries, it remains there even if the original conditions for inclusion are no longer satisfied. The data may therefore be taken as quite comprehensive with respect to the "old" industrial sector of firms that were inherited from the Soviet system. The whole Lithuanian dataset and the Ukrainian data starting with 1996 contain all firms regardless of size and industrial affiliation.[3]

Table 3.1 contains the numbers of firms and firm-year observations for state ownership as well as domestic and foreign privatizations. We base our regression estimates of the effects of domestic privatization on thousands of observations (the smallest number is in the case of the Lithuanian privatization time series, but even this is almost 6,500, while in the case of Russia we have almost 200,000 firm-year observations). The total number of foreign privatizations is much smaller but enough to estimate its effects.

Table 3.1: Number of observations in regressions by ownership type

	Always State		Privatized Domestic		Privatized Foreign	
	Firm-years	Firms	Firm-years	Firms	Firm-years	Firms
Hungary	27,505	6,064	74,763	6,579	9,008	712
Lithuania	9,010	1,353	6,454	705	448	42
Romania	29,686	4,783	69,458	5,739	2,442	184
Russia	79,436	9,933	194,053	13,801	2,959	188
Ukraine	78,437	12,397	86,063	7,540	3,805	283
Total	224,074	34,530	430,791	34,364	18,662	1,409

Privatization Policies

The methods and tempos of large enterprise privatization differed quite significantly across the five countries we study in this paper. Hungary got off to an early start in ownership transformation and maintained a consistent case-by-case sales approach throughout the transition. At the very beginning, the transactions tended to be "spontaneous", initiated by managers, who were also usually the beneficiaries, sometimes in combination with foreign or other investors (*Voszka*, 1993). From 1991, the sales process became more regularized, generally relying upon competitive tenders open to foreign participation, although management usually still had control over the process. Unlike many other countries, there were no significant preferences given to workers to acquire shares in their companies, nor was there a mass distribution of shares aided by vouchers. Hungarian privatization thus resulted in very little worker

3 The data are further described by *Brown et al.* (2006), (2010) who use a subset of the observations we study in this paper.

ownership (involving only about 250 firms), very little dispersed ownership, and instead significant managerial ownership and highly concentrated blockholdings, many of them foreign (*Frydman et al.* 1993a). Although the process appeared at times to be slow and gradual, in fact it was quicker than in many other East European countries.

In Romania, by contrast, the early attempts to mimic voucher programs and to sell individual firms produced few results, and, after a few "pilots", privatization really began in earnest only in late 1993, first with the program of Management and Employee Buyouts, and secondly with the mass privatization of 1995–96 (*Earle and Telegdy*, 2002). The consequences of these programs were large-scale employee ownership and dispersed shareholding by the general population, with little foreign involvement. Beginning in 1997, foreign investors became more involved, and blocks of shares were sold to both foreigners and domestic entities. Similarly, Lithuania went through a mass privatization in the early 1990s and subsequent sales; because our Lithuanian data start only in 1995, our results reflect these later privatizations. In both countries, the result was a mixture of several types of ownership and a slower speed than in Hungary.

Ukraine and Russia's earliest privatization experiences have some similarities to the "spontaneous" period in Hungary, as the central planning system dissolved in the late 1980s and decision-making power devolved to managers and work collectives (*Frydman et al.* 1993b). The provisions for leasing enterprise assets (with eventual buyout) represented the first organized transactions in 1990–1992, but the big impetus for most industrial enterprise privatization in Russia was the mass privatization from October 1992 to June 1994, when most shares were transferred primarily to the concerned firms' managers and workers, who had received large discounts in the implicit prices they faced (*Boycko et al.* 1995). Some shares (generally 29 percent) were reserved for voucher auctions open to any participant, and these resulted in a variety of ownership structures, from dispersed outsiders holding their shares through voucher investment funds to domestic investors who acquired significant blocks; sometimes managers and workers acquired more shares through this means, but there were few cases of foreign investment. Blockholding and foreign ownership became more significant through later sales of blocks of shares and through secondary trading that resulted in concentration. Ukraine used somewhat different mechanisms, but in general followed Russia's pattern at a slower pace. In both countries, the initial consequence was large-scale ownership by insiders and some blockholding by domestic entities. Concentration and foreign ownership increased subsequently.

These general patterns are reflected in *Table 3.2*, which contains the percentage of firms privatized to domestic and foreign owners. We define a firm as private if more than 50 percent of its shares are privately held; it is domestic if it is private and the number of shares held by domestic investors is higher than

those held by foreign owners; it is foreign if it is private but not domestic (nearly all foreign privatized firms by this definition are majority foreign-owned).[4]

Table 3.2: Private ownership shares

		1992	2004
Hungary	Domestic	0.37	0.60
	Foreign	0.03	0.09
Lithuania	Domestic	N.A.	0.37
	Foreign	N.A.	0.02
Romania	Domestic	0.00	0.80
	Foreign	0.00	0.03
Russia	Domestic	0.00	0.58
	Foreign	0.00	0.02
Ukraine	Domestic	0.00	0.48
	Foreign	0.00	0.01

N.A.= Not available.

As of late 1992, 37 percent of the Hungarian firms had already been privatized, while the process had not yet started in Romania, Russia, and Ukraine (for Lithuania we do not have data for this year). By the end of the period, a large proportion of firms had been privatized to domestic or foreign investors in all countries: 83 percent in Romania, 69 percent in Hungary, 60 percent in Russia, 49 percent in Ukraine and 39 in Lithuania.[5] The percentage of firms majority privatized to foreigners is by far the highest in Hungary, reaching 9 percent by 2004, while in the other countries this proportion is 1–3 percent. Given our sample sizes, it is still enough to estimate a foreign effect.[6]

Empirical Strategy

We follow the broader literature on the employment effects of privatization in estimating reduced form equations, while trying to account for potential problems of heterogeneity and simultaneity bias (*Djankov and Murrell*, 2002; *Megginson and Netter*, 2001). Estimating these effects faces some potential problems. The first is the possibility that aggregate shocks may affect employment and ownership.[7] Moreover, the shocks may be industry-specific, and the available deflators may not perfectly capture price changes. Most studies have too few observations at their disposal to be able to account for industry-specific fluctuations; yet if these are correlated with privatization, the estimates may be biased. Taking advantage of the large samples in our data, we include a full set of (2-digit) industry controls in levels and each interacted with a time trend. Unlike most previous studies, our data also contain a comparison group of firms that remain in state ownership throughout the period of observation.

A more difficult problem is the possibility of selection bias in the privatization process. Politicians, investors, and employees of the firms may all influ-

4 Ownership is measured at year-end. The Russian data do not contain an ownership variable before 1993, nor do they provide percentage shareholding. Virtually all the privatizations in our data are mass privatizations so the earliest date they could take place was October 1992. Nearly all these privatizations led to majority private ownership (e.g., *Boycko et al.* 1995).

5 These proportions seem very small compared to what was found in other studies using these data (*Brown et al.* 2010). The main difference in the proportion of firms privatized is that we use firms from all sectors of the economy while they had only manufacturing. We restricted our sample to manufacturing and obtained very high proportions of privatized firms. The energy sector and some services, however, have been privatized to a smaller extent. Industries with low levels of privatization include mining, energy, water distribution, and such service sectors as transportation, post and telecommunication, real estate, garbage collection, and cultural and sporting activities. The proportion of firms privatized by industries is available upon request.

6 See *Table 3.1* for sample sizes. The Russian registries contain codes for state, domestic, joint ventures, and 100 percent foreign firms, but foreign shares are available only for a subset of firms in four years. We classify all joint ventures as foreign.

7 Studies that estimate a privatization effect as the difference between pre- and post-privatization levels for a sample of privatized firms (e.g., *Megginson et al.* 1994) are unable to distinguish the effect of privatization from such aggregate fluctuations.

ence whether a firm is privatized and whether the new owners are domestic or foreign. Politicians concerned with unemployment may prefer to retain firms with the worst prospects in state ownership in order to protect workers from layoffs, and the employees themselves may work to prevent privatization in such cases. Potential investors are also likely to be most interested in purchasing firms with better prospects. To remove such time-invariant differences across firms, we therefore include firm fixed effects (FE) in some specifications. Since firms could also differ in their trend growth rates in ways that are correlated with ownership change, for instance because potential investors see growth opportunities, we add firm-specific trends to some specifications (labeled FE&FT). Taken together with the full set of industry-year interactions, the fixed effect and firm-specific trends also control for changes in the environment, including both competition from other firms and subsidies (implicit or explicit) from the government, that may also influence employment behavior at the firm level.[8]

The basic specification for the panel data model takes the following form for each country separately:

$$\log emp_{ijt} = \alpha_0 + \alpha_1 DO_{it} + \alpha_2 FO_{it} + Ind_j + Ind_j \times Trend_t + Year_t + u_{it}, \quad (1)$$

where *i* indexes firms, *j* indexes industries, and *t* indexes time periods (years). The dependent variable is the natural logarithm of the firm's employment, *Ind* and *Year* represent a set of 2-digit industry and year dummies, *Trend* is a time trend, and u_{it} is an idiosyncratic error.[9] The equation is estimated unweighted and weighted by employment, the latter in order to permit an assessment of the overall employment effect and the degree to which impacts vary with firm size.

Results

Tables 3.3 and *3.4* contain results for the unweighted and employment-weighted regressions estimating relation (1) with the natural log of average number of employees as the dependent variable. Equations are fitted by OLS, fixed firm effects (FE), and firm-specific trends (FE&FT). On an unweighted basis, the OLS specifications produce small negative domestic coefficients in Hungary and the other two non-fSU economies, but large coefficients in Russia and Ukraine, particularly the former. By contrast the foreign coefficients are all positive and large. As the OLS specification provides only a cross-sectional comparison of average employment in privatized years relative to years in state ownership (both for firms never privatized and the pre-privatization years for firms subsequently privatized), containing no control for previous size levels, these estimates cannot be interpreted as causal. Rather, they reflect a mixture of the causal effect and the selection effect of privatization on size, and they provide a useful baseline for the FE and FE&FT estimates.

The FE estimates, and even more so the FE&FT estimates, in *Table 3.3* show a narrower range of domestic coefficients, and some attenuation of the foreign

8 Firm fixed effects and trends also control for regional differences in the economic environment, for instance in labor market conditions that may affect employment and wage behavior.

9 Our estimates permit general within-firm correlation of residuals using *Arellano*'s (1987) clustering method. The standard errors of all our test statistics are robust to both serial correlation and heteroskedasticity.

coefficients. Sizable negative impacts are estimated only under FE for domestic privatization in Lithuania and Ukraine, each of them about –20 percent. In the other countries, as well as for these two in the FE&FT specification, all the estimates lie close to zero. In Hungary, the FE estimate for domestic privatization is actually a positive 0.048, while with FE&FT it is a small –0.029. The foreign coefficients are positive everywhere and they are statistically significantly different from zero. In Hungary, the estimated effect is 0.45 in the FE specification and 0.11 in the FE&FT. Thus, while the estimates do vary substantially across countries and across estimation methods, in no case is there evidence of large negative causal effects of privatization on employment, whether the new owners are domestic or foreign investors. Comparison of the FE and FE&FT results to each other, and to the OLS estimates, also shows that the direction of selection bias, the extent to which unobserved factors correlated with ownership influence the level and growth of employment, varies considerably across countries.

Table 3.3: Estimated effects of privatization on firm employment (unweighted)

		Hungary	Lithuania	Romania	Russia	Ukraine
OLS	Domestic	–0.106***	–0.178**	–0.126***	0.967***	0.077***
		(0.033)	(0.070)	(0.029)	(0.018)	(0.024)
	Foreign	0.698***	1.271***	0.705***	1.674***	1.369***
		(0.074)	(0.233)	(0.114)	(0.098)	(0.096)
FE	Domestic	0.048***	–0.222***	0.014	0.009	–0.186***
		(0.018)	(0.029)	(0.016)	(0.009)	(0.012)
	Foreign	0.450***	–0.091	0.155**	0.243***	0.208***
		(0.041)	(0.114)	(0.076)	(0.047)	(0.055)
FE&FT	Domestic	–0.029**	–0.051**	–0.036***	0.058***	–0.033***
		(0.012)	(0.023)	(0.010)	(0.006)	(0.009)
	Foreign	0.112***	0.014	–0.052	0.152***	0.127***
		(0.029)	(0.069)	(0.050)	(0.035)	(0.036)
N (firm–years)		111,276	15,912	101,586	276,448	168,305

Notes: Dependent variable: log(employment). The equations include industry, year, and industry-time trend interaction controls.
Standard errors (corrected for firm clustering) are shown in parentheses.
*** Significant at the 1% level; ** 5% level * 10% level.

The FE estimates, and even more so the FE&FT estimates, in *Table 3.3* show a narrower range of domestic coefficients, and some attenuation of the foreign coefficients. Sizable negative impacts are estimated only under FE for domestic privatization in Lithuania and Ukraine, each of them about –20 percent. In the other countries, as well as for these two in the FE&FT specification, all the estimates lie close to zero. In Hungary, the FE estimate for domestic privatization is actually a positive 0.048, while with FE&FT it is a small –0.029. The foreign coefficients are positive everywhere and they are statistically sig-

nificantly different from zero. In Hungary, the estimated effect is 0.45 in the FE specification and 0.11 in the FE&FT. Thus, while the estimates do vary substantially across countries and across estimation methods, in no case is there evidence of large negative causal effects of privatization on employment, whether the new owners are domestic or foreign investors. Comparison of the FE and FE&FT results to each other, and to the OLS estimates, also shows that the direction of selection bias, the extent to which unobserved factors correlated with ownership influence the level and growth of employment, varies considerably across countries.

Table 3.4: Estimated effects of privatization on employment (weighted by firm employment)

		Hungary	Lithuania	Romania	Russia	Ukraine
OLS	Domestic	-0.937***	-0.213	-0.717***	0.350***	-0.494***
		(0.092)	(0.129)	(0.121)	(0.064)	(0.098)
	Foreign	-0.083	0.145	0.151	0.712***	0.102
		(0.146)	(0.250)	(0.184)	(0.167)	(0.210)
FE	Domestic	-0.209***	-0.121**	-0.097***	0.061***	0.002
		(0.024)	(0.061)	(0.023)	(0.013)	(0.030)
	Foreign	-0.072	-0.295***	-0.052	0.235***	0.144***
		(0.045)	(0.098)	(0.043)	(0.044)	(0.035)
FE&FT	Domestic	0.037	0.008	-0.002	0.056***	-0.034
		(0.039)	(0.051)	(0.028)	(0.014)	(0.030)
	Foreign	-0.003	-0.085	0.009	0.179***	0.106**
		(0.055)	(0.052)	(0.105)	(0.051)	(0.045)
N (firm-years)		111,276	15,912	101,586	276,448	168,305

Notes: Dependent variable: log(employment). The equations include industry, year, and industry-time trend interaction controls.
Standard errors (corrected for firm clustering) are shown in parentheses.
*** Significant at the 1% level; ** 5% level * 10% level.

The unweighted estimates in *Table 3.3* provide answers to questions about the effects of privatization on firm-level employment behavior by country and estimation method, but without regard to firm size. *Table 3.4* weights the regressions by firm employment and therefore addresses questions on the overall impact of privatization on employment and on how the impact varies with firm size.[10] Again, the OLS estimates are shown only as a baseline, and only the FE and FE&FT estimates provide evidence on causal effects. These FE specifications show some more substantial negative effects for domestic privatization in Hungary, Lithuania, and Romania, and for foreign privatization in Lithuania (but recall the small sample size for the foreign estimates in Lithuania). However, all these coefficients become small and statistically insignificant in the FE&FT specification. Robust positive results emerge only in Russia and Ukraine for foreign privatization and for domestic privatization only in Russia.

10 The "overall impact" does not take into account any indirect effects, as privatized firm behavior may affect other firms through interactions in product and factor markets.

In summary, the FE results for Central Europe imply that the employment effect of privatization was more negative in larger firms, but the FE&FT results suggest little difference once firm-specific trend growth is taken into account.

The Effect of Privatization on Wages

Another interesting aspect of privatization policies is the effect on workers' wages. The effect of privatization on wages may be negative if new private owners are more profit oriented than the state, and in their attempt to reduce costs, expropriate worker rents.[11] But the cost-reduction effect may be offset if privatized firms pay more to attract new workers, elicit more effort, or reward higher productivity. Depending on the relative strength of these mechanisms, wages may either rise or fall as a result of privatization.

The effect of privatization on wage differentials is also ambiguous theoretically. The new private owners strive for cost reduction, which affects the wages of all workers. This would lead to a drop in wages for all worker types. If the state-owned enterprise (SOE) was overstaffed with non-production workers as argued for instance by *Kornai* (1992), it is possible that across-the-board cost cutting will have a larger effect on university graduates and non production workers and so their wages would fall more, at least relative to production workers. On the other hand, if the firm adapts new technology and therefore replaces production workers with more skilled employees (*Katz and Murphy*, 1992), the wages of those with vocational education or in blue collar occupations may fall more. If the skill-biased technological change leads to replacement of workers carrying out routine tasks with robots and computers, it is also possible that low-skilled workers who do non-routine tasks (such as driving or cleaning) would gain relative to skilled production workers and clerks (*Katz et al.* 2006).

Although the effect of privatization on wages has direct policy relevance and its understanding would also shed light on the behavior of state-owned enterprises, surprisingly few papers have studied it. An example of an early attempt to analyze the average wage effects of privatization is *Haskel and Szymanski* (1993), who study a small sample of British privatized firms. *Brown et al.* (2010) use firm level data from four transition countries' manufacturing sectors and find that average wages fall little (less than 5 percent) after domestic privatization, and transfers to foreign owners actually increase workers' wages. Only one study analyzes the effects of privatization on wage differentials: *Melly and Puhani* (forthcoming) look at the personnel records of one large firm which underwent privatization and conclude that women, low skilled workers, older, and high-tenure workers experienced relative wage cuts after privatization.

In this chapter we build on this research but also expand it in several dimensions. We use a linked employer-employee data covering all large Hungarian firms from all industries, and a random sample of their workforce. The panel

11 A related literature discusses such expropriation in hostile takeovers (*Shleifer and Summers*, 1988; *Gokhale et al.* 1995).

is long, covering more than 20 years, and most privatized firms are observed for several years both pre- and post privatization, which enables us to use panel techniques to control for possible selection of firms into privatization. We therefore study not only one firm or a limited set of industries, but the entire enterprise privatization in Hungary. The data allow analyzing not only of average wages but also the wages of various demographic and skill groups and occupations. We produce results for both domestic and foreign privatizations which present very different wage behavior after privatization.

In the following we present the data and the empirical setting, and the results.

Data, Descriptive Statistics, and Empirical Methodology

The dataset used in this paper is the Hungarian linked employer-employee data, which is a large panel in firms which cover all the sectors of the economy. The data are a 23 year long panel in firms (from 1986 to 2008) but not in workers. They cover essentially all large firms of the economy and a sample of smaller enterprises. We include in this study only those firms which were state-owned at one point so they were at risk of privatization. Since we have information on both firms and workers, we can control for selection into privatization at the firm level while the worker level data allow the use of individual wages, controls for individual characteristics and the analysis of wage differentials. Workers are sampled randomly at the firm level, which covers approximately 8 percent of its employment.[12] The number of observations per firm varies, but in some cases, particularly in small firms there are only a few (sometimes only one) employees observed. To study wage differentials, we need firms which have a large enough sample of employees to get consistent and robust estimates on their relative wages. To satisfy this condition, we use only those firms which have observations on more than 10 workers. The resulting sample is quite large, composed of more than 1,200 domestic and 240 foreign privatizations, as well as a control group of 311 never privatized SOEs.[13] *Figure 3.1* presents the evolution of ownership and shows the early start of Hungarian privatizations and the heavy presence of foreign investors. By the turn of the century, the share of state-owned firms declined to 35 percent while domestic and foreign privatized enterprises increased their weight from zero to 40 and 25 percent, respectively.[14]

Firms under the three ownership types differ in many respects, suggesting that selection was indeed non-random and its treatment is important. As *Table 3.5* demonstrates, monthly earnings are quite similar in never privatized and domestically privatized firms, but they are much higher in foreign-owned companies.

The share of workers along various individual characteristics also varies across types of owners: female workers are least prevalent in always state-owned companies, more likely to work in domestically privatized firms and their share is the highest in foreign-owned enterprises. Measured by the highest degree

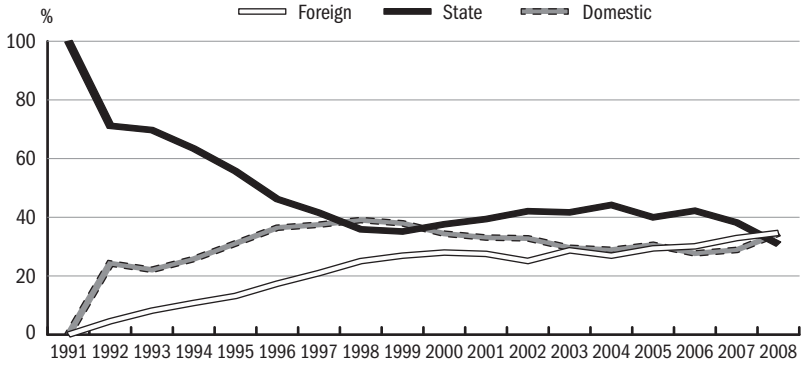
12 For a description of the data, see *Chapter 2* of *Infocus – II*.

13 We define a firm as privatized if it was ever state owned and the state is a minority owner; if the shares owned by domestic private owners exceed those owned by foreigners, the firm is domestically privatized; otherwise it underwent a foreign privatization.

14 The increase of the share of SOEs thereafter is due to sample changes, not nationalizations of already privatized companies.

completed, the skill level of employees is highest in foreign-controlled firms and lowest in SOEs. Average work experience is the lowest in foreign companies, and highest in the domestic ones.

Figure 3.1: Evolution of ownership



$N = 35{,}483$ firm-years.

Table 3.5: Worker characteristics by ownership

	State-owned	Domestic	Foreign
Monthly Earnings	149.2 (109.7)	135.5 (142.9)	236.6 (244.1)
Female (%)	38.3	41.8	43.5
Education (%)			
Elementary	35.3	26.5	16.6
Vocational	27.7	36.7	27.9
High school	29.9	27.8	37.6
University	6.9	9.0	17.9
Experience (years)	22.8 (11.0)	24.0 (10.7)	21.3 (10.7)
Occupation (%)			
Managers	6.2	10.5	9.1
Professionals	4.5	3.3	8.0
Associate Professionals	14.2	10.9	20.2
Clerks	8.3	7.5	6.4
Service Workers	9.4	8.3	6.4
Skilled Manual Workers	46.8	50.2	45.2
Elementary Occupations	10.5	9.3	4.8
Worker–years	1,265,138	287,584	165,539
Firms	311	1,217	240

Notes: Weighted unconditional means (standard deviations). Earnings measured in thousands of 2008 HUF, deflated by CPI. The definition of occupations follows ISCO-88 where Elementary Occupations, Service Workers, Clerks, Associate Professionals, Professionals and Managers coincide with the corresponding major groups; Skilled Manual Workers cover Skilled agricultural and fishery workers, Craft and related trades workers and Plant and machine operators and assemblers.

There are some notable differences in the occupational structure of firms as well. The share of workers engaged in elementary occupations is small in foreign owned firms, while the share of associate professionals and professionals is very high. State owned enterprises have fewer managers than privatized companies.

We estimate the following equation to study the wage effect of privatization:

$$lnw_{ijt} = a_1 + \beta_{it} X_{it} + a_d DOMESTIC_{j,t-1} + a_f FOREIGN_{j,t-1} + \\ + \Sigma\beta_j REGION_j + \Sigma\lambda_t YEAR_t + z_{ijt}. \quad (2)$$

X_i is a vector of individual characteristics including a dummy variable for female, three educational dummies (vocational, high school, and university, the omitted category being at most 8 years of schooling), and three dummies for potential experience (11–20, 21–30, and more than 30 years of experience, the omitted category being 0–10 years of experience). The coefficients of interest, a_d and a_f provide the conditional effect of domestic and foreign privatization. As selection into privatization is likely to be non-random, we add firm fixed effects a_i to the regression.

When we analyze wage differentials, we use the same equation except that the domestic and foreign privatization dummies are interacted with the elements of X_{it}:

$$lnw_{ijt} = a_i + \beta'_{it} X_{it} + a'_d DOMESTIC_{j,t-1} + a'_f FOREIGN_{j,t-1} + \\ + \gamma'_d X_{it} DOMESTIC_{j,t-1} + \gamma'_f X_{it} FOREIGN_{j,t-1} \\ + \Sigma\beta'_j REGION_j + \Sigma\lambda'_t YEAR_t + z_{ijt}. \quad (3)$$

In this specification the parameters of interest are γ'_d and γ'_f, and they show how wages are affected by domestic and foreign privatization relative to the base category of worker. In another specification, we substitute the individual characteristics with occupational categories to see how the wage effect of privatization varies by occupation.

Results

The estimated effects of domestic and foreign privatization on average wages are presented in *Table 3.6*. The OLS estimates represent the difference in wages between SOEs and domestic and foreign privatizations, after controlling for gender, education, experience, region and year. They show that average wages at domestically privatized enterprises are more than 12 percent lower than the average wage in SOEs. Foreign owned companies, on the contrary, pay a wage premium of 24 percent. These results, however, may reflect biased selection of firms into privatization. The fixed effect estimations control for any such selection that is time-invariant. They indeed show that the wage effects of domestics and foreign are smaller than the OLS regressions suggested, but nonetheless they are still large. Domestic private owners are estimated to decrease wages by 9 percent after acquisition while foreign owners increase them by 12 percent.

Table 3.6: Estimated effect of privatization on wages

	OLS	Standard error	FFE	Standard error
Domestic	–0.124***	0.020	–0.093***	0.016
Foreign	0.238***	0.029	0.117***	0.021

Notes: $N = 1{,}718{,}261$ worker–years. Dependent variable = ln(real gross earnings). The equations include year, region, gender, education, experience, and occupation controls.
Standard errors corrected for firm clustering.
*** Significant at the 1% level; ** 5% level * 10% level.

Do these changes in wages affect all workers proportionally, or do they vary by type? To start with wage differentials by gender, education, and experience in *Table 3.7*, the domestic privatization effect for the reference group (male workers with only elementary education and 0 to 10 years of experience) is –8.4 percent. Relative to this group, female workers have a wage gain of 5 percent (so the overall female wage effect of domestic privatization is –3.4 percent). By the level of education there is a slight upward trend in the privatization effect: high school and university graduates have a wage premium of 3.3 and 4.3 percent relative to the reference group. Domestic privatization clearly favors young employees as all workers who have more than 10 years of experience have a wage decline of about 6 percent more than their younger fellows. Therefore, the category which has the smallest drop in wages (they actually have a tiny increase) is young, high-skilled female workers, who are estimated to earn about 1 percent higher wages than before privatization.

Table 3.7: The effects of privatization on the wage structure: gender, education, experience

	Domestic	Standard error	Foreign	Standard error
Privatization Effect for Reference Group	–0.084***	0.014	0.036	0.024
Ownership interactions				
Female	0.049***	0.011	0.050***	0.016
Vocational	–0.004	0.008	0.021	0.012
High school	0.033***	0.013	0.034**	0.017
University	0.043**	0.020	0.168***	0.029
Experience: 11–20 years	–0.058***	0.006	–0.023**	0.011
Experience: 21–30 years	–0.060***	0.008	–0.025	0.013
Experience: 30+ years	–0.053***	0.011	–0.015	0.017
R^2-within		0.365		

Notes: $N = 1{,}718{,}261$ worker-years. Dependent variable: ln(real gross earnings). The estimated coefficients on domestic and foreign wage differentials come from the same regression. Reference group: male with elementary education and 0–10 years of labor market experience. The equations include year, region, gender, education, experience controls and firm fixed effects, and are weighted by employment.
Standard errors corrected for firm clustering.
*** Significant at the 1% level; ** 5% level * 10% level.

The variation of the foreign wage effect is presented in the second column of the table. The reference group has a wage premium of 3.6 percent but this is not significant at any conventional level. There are some similarities in the effects of wage differentials with domestic privatization: females earn 5 percent more than the reference group, and the wage differential measured for vocational and high school graduates is practically the same across the two ownership types. Foreign investors also favor young workers, but the effect is smaller (and statistically less precise than for domestic ownership). The main difference between the foreign and domestic wage effects materializes in university graduates. While the wage premium of this skill category is only 4 percent after domestic privatization, such workers in foreign-privatized companies are estimated to gain 17 percent higher wages relative to the reference group.

The estimated wage effects of privatization by occupations are presented in *Table 3.8*. Domestic privatization is estimated to have no effect on the wages of professionals. Associate professionals, skilled non-manual workers and those in unskilled occupations experience a wage loss of 4–6 percent and managers of 7 percent. The largest wage losers are service workers and skilled manual workers, who earn less by 10 and 14 percent, respectively. Foreign owners raise managers' wages the most (by 34.5 percent) and professionals (by 25 percent). Associate professionals and skilled non-manual workers get a wage increase of 7–10 percent, which is similar to that which unskilled workers obtain. Service and skilled manual workers receive essentially no wage increase after privatization.

Table 3.8: The wage effects of privatization by worker occupation

Ownership interactions	Domestic	Standard error	Foreign	Standard error
Manager	–0.073	0.038	0.345***	0.056
Professional	–0.034	0.023	0.247***	0.032
Associate Professional	–0.055**	0.025	0.095***	0.034
Clerks	–0.044**	0.017	0.070***	0.025
Service	–0.102***	0.028	0.004	0.066
Skilled manual	–0.128***	0.015	0.031**	0.015
Unskilled	–0.060***	0.012	0.100***	0.025
R^2-within		0.343		

Notes: $N = 1{,}718{,}261$ worker-years. Dependent variable: ln(real gross earnings). The estimated coefficients on domestic and foreign wage differentials come from the same regression. Reference group: male with elementary education and 0–10 years of potential labor market experience. The equations include year, region and occupation controls and firm fixed effects, and are weighted by employment.
Standard errors corrected for firm clustering.
*** Significant at the 1% level; ** 5% level * 10% level.

Conclusion

Although economic analyses of the effects of privatization have largely focused on firm performance, the greatest political and social controversies have usually concerned the consequences for the firm's employees. In most cases, it is assumed that the employment and wage effects will be negative, and workers all around the world react to the prospect of privatization, especially when foreign owners may become involved, with protests and strikes. Yet there have been very few systematic studies of the relationship between privatization and outcomes for the firm's workers, and previous research has been hampered by small sample sizes, short time series, and little ability to control for selection bias. It has therefore remained unclear whether workers' and policymakers' fears of privatization are in fact warranted.

In this paper, we have analyzed the effects of privatization on the firm's employment using comprehensive panel data on firms in Hungary and four other transition economies that all adopted large-scale privatization programs but used different methods of privatization. The data for these countries contain similar measurement concepts for the key variables, and we have applied consistent econometric procedures to obtain comparable estimates across countries.

Our results provide no evidence for strong negative effects of any form of privatization on employment. Estimated by FE&FT, the employment effects are seldom both negative and statistically significant, and when they are the magnitudes are not large, nearly always remaining under 5 percent. The FE results for domestic ownership in the Central European economies contain a few more negative coefficients, but none of these are robust to including firm-specific trends (FT). The estimated coefficients on foreign ownership tend to be larger and positive for all countries, except for a few cases of statistical insignificance. It is striking that the absence of large negative employment effects of privatization holds consistently across all five of the countries, which span the distribution of reform experiences. If we had found large negative effects in Ukraine and Russia, towards one end of the spectrum, then we might be able to infer that other less-developed economies, perhaps those in Central Asia, would face similar problems. Or if we had found large negative effects in Hungary, the Eastern European economy closest to a developed market economy at the beginning of the privatization process, then we might deduce that such effects are, contrary to expectation, largest where the deviation from market outcomes is the least. We do not find any such patterns, however; rather, our findings reject the hypothesis of large negative consequences for employment in all 5 countries. Thus, while extrapolation always requires caution, it seems fair to say that our results carry no implication that privatization would be more likely to reduce employment in other contexts.

To study the wage effects of privatization, we used a Hungarian linked employer-employee dataset. The large samples of firms within industries, the long time series of observations before and after privatization, and the availability of state-owned comparison groups enable us to identify privatization effects from variation due to deviations from firm-specific means and trends. Domestic privatization decreases wages by about 10 percent in Hungary while foreign takeovers raise them by about 12 percent. These wage changes are not uniform across worker types. The new domestic and foreign private investors favor young skilled workers and females are also better paid than under state ownership. Wage differentials arise across occupations as well: in the case of domestic (foreign) privatization, the strongest decline (lowest increase) is found for skilled manual and service workers. The analysis, therefore, provides some evidence that privatization brings about skill-biased technological change and polarization, and this effect is stronger when the firm is acquired by foreign owners.

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4. THE IMPACT OF INTERNATIONAL TRADE ON EMPLOYMENT AND WAGES

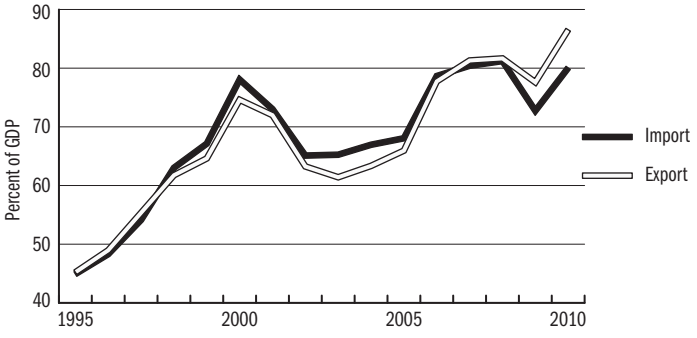
MIKLÓS KOREN & PÉTER TÓTH

Introduction

Since the 2008/2009 crisis the positions of anti-globalist and protectionist views has been strengthening all over the world. International trade, and more importantly, the global supply chains contributed to the fast and worldwide spread of the crisis originally limited to a handful of countries (see *Békés et al.* 2011). As a response to this, some countries introduced regulations that favor domestic firms over foreign companies. Since November 2008 countries of the G20 group have taken approximately 1000 policy measures that discriminate against foreign economic interests (*Global Trade Alert,* 2012). The purpose of this economic policy is understandable: we should protect the domestic firms and the workers from the effects of the global crisis.

However, if these measures become permanent, they will influence economic growth in the long run. Especially in such a small, open economy like Hungary, one cannot disregard the long-term effects of trade protectionism. To understand these, we should look back to a previous period, to the ten years prior to Hungary's EU accession. Privatization took place during this period, and among numerous reforms, international trade became significantly more liberalized. For example, following the trade agreement with the European Economic Community in 1992 the average tariff on products in machine manufacturing decreased from 10 percent to 1 percent by 1997, and tariffs were lifted entirely by 2001.[1] Of course the effect of trade liberalization also appears in the level of magnitude of the imports and exports *(Figure 4.1).*

Figure 4.1: The import and export as a percentage of the GDP over time



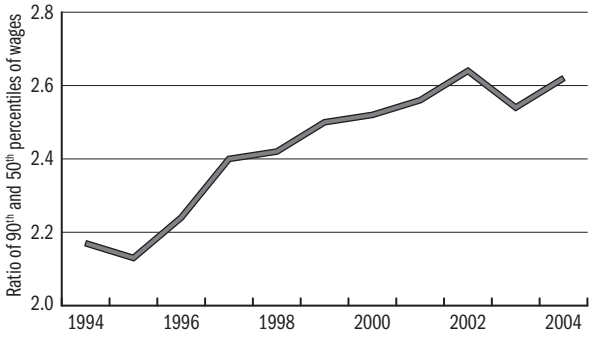
Source: *Hungarian Central Statistical Office.*

1 Hungary's EU accession in 2004 changed the rules of data reporting significantly as well, so our analysis ends with the year 2003.

But what are the effects of this large-scale opening up on the Hungarian labor market? Although most of the theoretical models on international trade show that the country as a whole benefits from trade liberalization, certain groups within society might be more vulnerable. Opening up to international trade necessarily implies a redistribution of wealth. Given the change in the production structure, certain factors of production (for example labor or capital), industries (exporting and import-competing), or even certain firms (large and more productive, small and less productive) and workers (for example according to education) benefit from the aggregate income to a different extent.

It is important to see that the distributional conflict is not between foreign and domestic groups (because in our experience both countries win at the national level), but between groups within a country. This is especially interesting on the labor market, where the employees having different backgrounds (regarding skills and education) have different chances for a higher wage. The beneficial macroeconomic effects of international trade might not be present in every group. As *Figure 4.2* shows, workers with high wages are in a more and more favorable position throughout the examined period.

Figure 4.2: The development of income inequalities. The ratio of the 90th and 50th percentiles of the wage distribution between 1994 and 2004



Source: Authors' calculations from the *Wage Survey* (Bértarifa).

In this chapter we present the effects of the international trade on wages. Besides reviewing the literature we mainly focus on Hungarian firm and worker-level data between 1994 and 2003. Our central question is: how do the wages of the workers change when a firm starts to export or import? The firm and individual-level data help us to distinguish the effect of international trade from the effects of other changes in economic policy in this period. Namely, as we will see, not every firm participates in external trade; this way we can make a comparison between workers exposed and not exposed to international trade who are otherwise from the same occupational group and industry. With this we indirectly examine the changes in the firms' labor demand.[2] The drawback

2 If the labor supply curve experienced by the firm is increasing, the labor demand and the paid wage has a positive upward sloping relationship.

of our method of analysis comes with its strength, since we should abstract from the aggregate effects of international trade that are related to industry or country-level channels. The regression coefficients will not contain those – in the long run potentially significant – effects of trade liberalization that work by, for example, making the firms increase their quality standards in a whole sector affecting the productivity (hence the wages) at the industrial level. This is because in the regressions we take out the variation caused by industrial heterogeneity (we control for it). Similarly, the – more complicated, still probably very important – long term general equilibrium effects will not be identified either. An important example for the latter could be that the opening up for international trade generated a higher wage premium in the groups of skilled workers, which in turn gave an incentive for the younger generation to become better educated, by which they would increase the productivity of the economy *as a whole*, so this effect would appear in every worker's wage. These effects, present on some aggregate level are not identifiable with our methodology and data. However, luckily they all belong to the benefits of liberalization, so in this sense the results enumerated in this chapter can be regarded as lower bounds for the effects of international trade.

One of our main results is that the firms active in external trade are special. They are larger, more productive and pay higher wages. As we will see this is partially the result of self-selection, but in part it signals a causal relationship. This also means that the average Hungarian worker gains from the opening up to international trade, since the ratio of well-paid jobs is increasing in the economy.

A maybe more surprising result is that imports are at least as important as exports. The importer firms are also larger, more productive, and pay higher wages than the non-importers. It is not true that the "export is good, import is bad". The reason for this is that the importers can produce at a cheaper level and become capable of increasing their market share, thus their labor demand increases too. Later we will show in detail how the firm's import can provide growth opportunities. An important consequence of this result is that a discriminatory policy against imported goods holds back the demand for Hungarian labor.

Of course, as we mentioned earlier, not everybody gains in the same way. The middle managers and skilled workers experience the highest increase in wage. Furthermore, we show that one can find certain industries and occupations (for example certain unskilled occupational groups in the food industry), where increasing imports lead to a decrease in wages.

Our chapter summarizes several papers written using foreign and Hungarian microdata. Every Hungarian paper (*Koren and Csillag,* 2011; *Halpern, Koren and Szeidl,* 2011; *Tóth,* 2011; *Halpern et al*. 2012 and *Pető,* 2012) measures the firm's export and import behavior based on the *Customs Statistics* (Vámstatisztika). We regard a firm as an exporter if it pursues export activity

to any extent; respectively we call it an importer if it is importing goods of any value.[3] The latter only includes direct imports, but it does not incorporate the purchase of imported products through wholesalers or distributors. With this we underestimate the level of the actual firm import. Our results, if not stated otherwise in the text, are based on manufacturing data. The worker-level data come from the *Wage Survey* (Bértarifa), which contains a 6–10% sample of the private sector employees. From this dataset we mainly use the gross monthly wage as a dependent variable, but of course we take into account individual-level control variables too.

At first we present the main characteristics, along which the firms that participate in external trade differ from the ones that do not, and we examine if these differences are the result of the exporting or the importing activities. Then we focus on importing as an important, but so far poorly analyzed trade channel. We show that the import increases the firm's productivity, and this way it provides the opportunity for the firm to expand. After this we investigate the effect of the import on the worker's wages, separating the certain effect mechanisms. Finally, we also explore how the firm's activity in international trade affects wage inequality. We conclude our paper with policy recommendations.

The firms involved in international trade

Until the 1990s the literature on international trade considered countries and industries as a unit of analysis, we only have results from the recent period that focus on the firm or the worker. This is an important step forward, because it is not the countries but rather firms that are trading with each other after all; moreover, in this way we can gain an insight into the nature of the wage inequality possibly caused by international trade activity.

Examining data on US firms with trade activity *Bernard and Jensen* (1999) asked if the export or the import increases the productivity of the firm. Although it can be unambiguously established that the importing/exporting firms are more productive, it is unclear which is the cause and which is the effect. Did the firms commence exporting because they were highly productive, or did they become more productive than average because of the export activity? To be able to abstract from the effects of those characteristics in the regressions later, and to have a more accurate view as to what kind of firms participate in international trade, in this part of our paper we explore by what characteristics exactly are the active firms special.

Why would the trading firms be different? The main argument is (for example *Melitz,* 2003 or *Altomonte and Békés,* 2009) that the export and import activity has fixed costs. There are costs of entering a market – for example searching for trade partners, setting up a distribution network, marketing –, which arise even if the firm wants to sell only a small amount in the foreign country. These costs can be so significant that starting to sell internationally

3 Including larger exporters and importers leads to the same qualitative results.

(setting up sales channels etc.) or to import (knowledge of the foreign market and other information problems etc.) is only profitable for firms having considerable resources. In Hungary we need to add to this the cost of bridging the language barrier or the extra uncertainty regarding the future (especially in the mid-1990s), for example to assess in the changing institutional environment whether the German machine that represents cutting-edge technology offsets its cost within ten years.

For these reasons we might suspect that the firms engaged in export or import are larger and more productive than the others; following an economies of scale argument we can see that it is easier for a larger and more efficient firm to outweigh the sunk costs with the possible extra profit from the trade activity. Furthermore, it follows from the former observations that firms involved in international trade probably employ more skilled workers (for example more employees need to speak English), and they reach high productivity with a more advanced technology and a higher capital-labor ratio.

These are more or less the distinctive factors that *Bernard et al.* (2007) also highlight in their article. Looking at the ratio of the exporter/importer firms and the intensity of the activity, the authors establish that trade is very concentrated. For example, only 4 percent of the firms in the US were exporters in 2000. Moreover, they describe the results already mentioned above. The firms engaged in international trade are already more productive before starting the activity; they use more skilled labor and capital in the production process relative to the other firms; they are larger, more productive, and grow faster after becoming involved in trade.[4]

We might suspect that the firms involved in international trade have similar characteristics in Hungary too. It is also likely that the import activity is much more present in the automobile industry than in sylviculture, and that the internationally active firms are concentrated in Budapest and in the more developed counties in West-Hungary, since firms are more productive in general there. *Békés et al.* (2011) gives a detailed descriptive analysis about Hungarian exporting and importing firms, and *Altomonte and Békés* (2009) describe further aspects of the data. These papers confirm that the Hungarian firms behave similarly as in other countries described in the literature.

As *Table 4.1* shows, the firms engaged in international trade are special indeed; the Hungarian data give the same qualitative results along all of the variables analyzed by *Bernard and Jensen* (1999) that we saw in the case of American firms. The table presents the important characteristics of the average firm for the whole 1994–2003 period and for three years (1994, 1998, 2003) in detail: size (number of employees), the logarithm of the capital-labor ratio, the ratio of the employees with higher education and productivity. The last variable is defined as the logarithm of the ratio of the revenues and the number of employees.

4 These results are partially confirmed for other countries as well. For example *Mayer and Ottaviano* (2008) for 8 European countries, *Castellani, Serti and Tomasi* (2010) for Italy regarding the size and productivity of firms. As for developing countries, *Eaton et al.* (2007) show from Colombian data that exporters are more productive already before starting to export. Furthermore, for example *Castellani, Serti and Tomasi* (2010) in their paper also add the spatial and industrial concentration as a new dimension to the original list of characteristics regarding exporters.

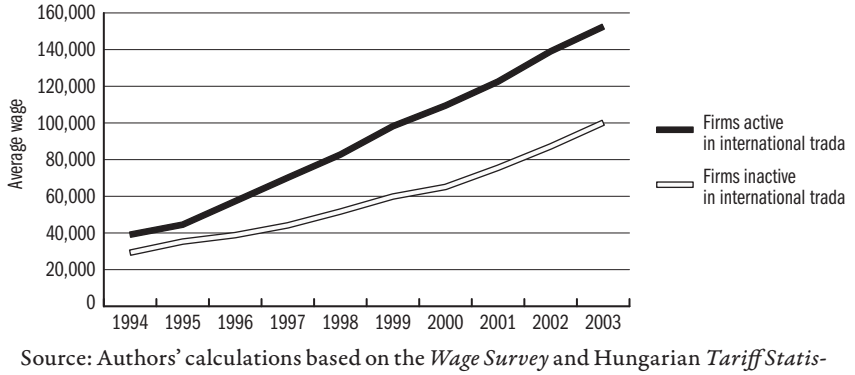
Table 4.1: Some average characteristics of firms participating in international trade compared to internationally inactive firms

	Number of employees		Log of capital-labor ratio		Ratio of employees with higher education		Productivity	
Year	active in trade	not active in trade	active in trade	not active in trade	active in trade	not active in trade	active in trade	not active in trade
1994	465.62	126.23	–0.09	–0.19	0.12	0.10	1.79	–0.29
1998	239.58	58.85	0.38	0.15	0.15	0.09	1.94	1.30
2003	248.19	65.39	1.05	0.68	0.18	0.17	2.56	1.98
1994–2003	302.63	77.81	0.44	0.29	0.15	0.12	2.29	1.64

Note: The main distinctive characteristics of exporting firms stated by *Bernard and Jensen* (1999) are also present among Hungarian firms that participate in international trade.
Source: Calculations of the authors based on Hungarian tariff data from 1994–2003.

We can see from the table that the firms active in international trade have on average approximately 3.5 times more employees compared to other firms. The ratio of the applied capital and labor in the production is also always higher for the firms that are either exporters or importers, and the difference is growing in time – the capital-labor ratio of the firms that are involved in international trade is 110% of the capital-labor ratio of the inactive firms in the first year, and approximately 140% in the last year of the data. Similarly, the ratio of employees with higher education is higher among the firms that are trading, although this variable does not distinguish the two groups as clearly as the former ones; the aggregate difference is only 3 percentage points, and we can find only a 1 percentage point difference for 2003 too. However, productivity shows a more straightforward picture again; the firms with foreign trade partners have on average 82% more revenue per worker, which is a large difference. *Figure 4.3* demonstrates that this difference also appears in the wages.

Figure 4.3: Average wages (HUF) at firms that participate in international trade and in the group of internationally inactive firms



Source: Authors' calculations based on the *Wage Survey* and Hungarian *Tariff Statistics*. The average wages are in Hungarian forint (HUF), one euro is worth about 300 HUF.

The graph also shows that the positive correlation between international trade activity and wages is significant. The difference between the wages paid in the two groups was growing throughout the years, and has stabilized at approximately 30%.

Export or import?

So the firms participating in international trade are special in several ways, and their wages are also higher. What is the reason for this? Are importers also larger and more productive, just as exporters?

It is commonly believed that the export activity shows the success of a firm, industry or even country, since a company is only capable of exporting if its product is competitive on the market, if it offers a good quality product at a cheap price. On the other hand, imports are believed to crowd out domestic producers, so we usually do not associate beneficial aspects to it.

However, the data show that this way of contrasting imports with exports is not justified. In *Table 4.2* we present average wages paid by firms in different categories regarding trade activity (only exporter, only importer, both, none) for the year 2003. Both the exporters and the importers pay higher wages on average compared to the firms that do not participate in international trade. The highest, 45 percent wage difference is between the importer and non-importer firms, while the role of the export seems to be smaller, only 12 percent.

Table 4.2: Average wages paid by exporter and importer firms (Hungarian forint)

	Non-importer	Importer
Non-exporter	100,100	145,200
N (number of firms)	4,349	1,154
Exporter	111,900	157,300
N (number of firms)	418	2,884

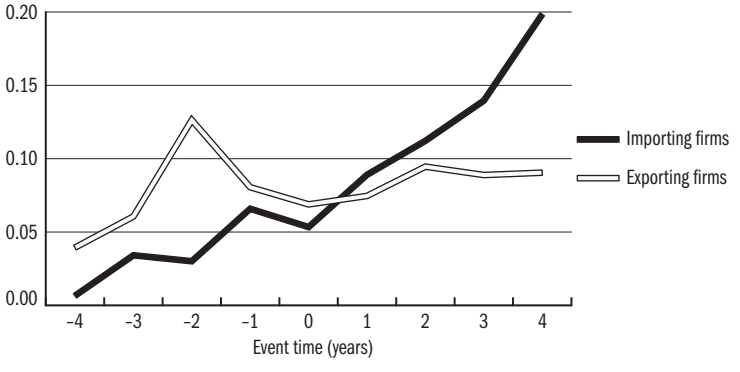
Note: The table shows the average gross monthly wage in manufacturing for the year 2003. Exporter is the firm that made sales abroad of any value in 2003. Importer is the firm that directly bought a product from abroad in 2003.
Source: The authors' calculations based on the *Wage Survey* and *Hungarian Tariff Statistics*.

From these wage differences of course it does not follow that international trade would directly affect wages. According to the last subsection the internationally active firms are in many ways different from their inactive counterparts, and it might be the case that the wage difference only reflects these differences of the firms. For example perhaps a well-educated, skilled manager who speaks foreign languages makes it possible for the firm to pay higher wages through better management practice. At the same time the manager also builds international relations and involves the company into external trade, but this might not have any effect on the wages in itself. In this case

we would observe higher wages at firms that are engaged in export/import activities, although there would be no causal relationship between international trade and the wages.

To be able to distinguish the effect of self-selection from the real causal effect on the wages, let us consider the following event study. We examine how the wage changes before and after the firm starts to export/import. *Figure 4.4* shows the wage difference from the non-exporter/non-importer firms as a function of the "event time". The event time is defined as the number of years which have passed since the first export/import. In the case of a negative number the event has not happened yet, for example t=–2 means that the firm will start to export (or import) two years later.

Figure 4.4: The wage difference through time before and after the start of the export/import activity



Note: The figure shows the difference of the log gross monthly wage at the exporter/importer and the internationally inactive firms. The reference group is the group of firms that do not participate in international trade. Exporter is the firm that made sales abroad in any value between 1992 and 2003. Importer is the firm that directly bought a product from abroad between 1992 and 2003. The estimates are calculated after controlling for occupational heterogeneity (4-digit codes) and time effects (year dummies).

Source: The authors' calculations based on the *Wage Survey* and *Hungarian Tariff Statistics*.

The figure depicts the exporter and importer firms' wage premium separately. The exporters already pay higher wages than the non-exporters four years prior to becoming exporters, and this wage difference does not grow after the start of the trade activity. We could potentially interpret this as follows: these firms are special before the export activity; they are well-managed, employ skilled labor, and this is the reason why they pay higher wages. Exporting is rather a symptom of their success, not the cause of it.

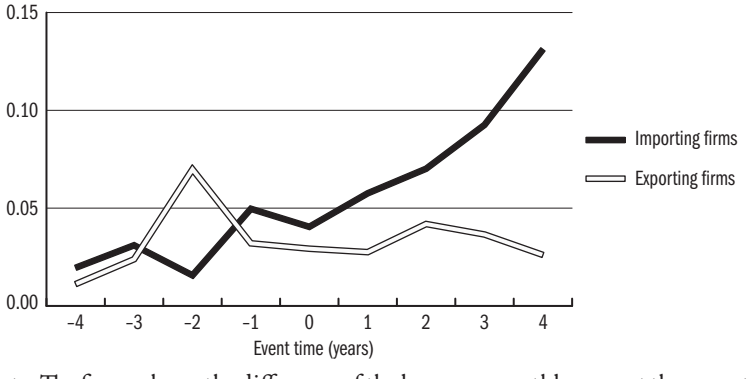
However, the wage difference calculated for importing firms is continuously growing, and it is much higher after becoming an importer than the years before the start of the activity. Nevertheless, it is interesting that this wage growth

is observable before the first importer year, a possible reason for which is that the firm employs workers who can better use foreign products and technology.

Although the increasing wage differences are consistent with the idea that the import causes the wage growth, it does not prove the causal relationship. At the time when the firm starts to import it might also undergo several other organizational changes, and some of them may cause an increase in paid wages (this is true of course for the exporters as well). It might be that the importing firm actually lays off some people, and fires its unskilled workers. Although in *Figure 4.4* we controlled for occupation with 4-digit FEOR codes (Hungarian code system of occupations), of course even within the same occupation there might be higher and lower paid workers. Moreover, it is also possible that the firm imports machines as an investment, and the increase we observe in wages only reflects a higher capital-labor ratio; it is not the effect of the import activity.

In *Figure 4.5* we try to control for these effects by taking out the variation caused by individual-level variables (gender, age, education) and certain firm-level variables (size, fixed assets, foreign ownership). As we can see in the figure, the estimates for the wage differences are smaller than earlier, but the tendency they show is similar. The export wage differential is positive before the start of the actual activity and it is somewhat stable through time, while the import wage differential rather increases.

Figure 4.5: The wage differences before and after the start of the trade activity – after controlling for individual and firm characteristics



Note: The figure shows the difference of the log gross monthly wage at the exporter respectively importer and the internationally inactive firms. The reference group is the group of firms that do not participate in international trade. Exporter is the firm that made sales abroad of any value between 1992 and 2003. Importer is the firm that directly bought a product from abroad between 1992 and 2003. The estimates are calculated after controlling for occupational heterogeneity (4-digit codes), gender, age, education, firm size (number of employees), capital-labor ratio, foreign ownership and time effects (year dummies).

Source: The authors' calculations based on the *Wage Survey* and *Hungarian Tariff Statistics*.

How does the import affect the firm and its employees? Why are importer firms able to pay higher wages? Since these results do not match our preliminary expectations, we believe it is worthwhile to examine the effects of the import more closely.

The effects of imports and offshoring

Offshoring probably belongs to the most heavily debated questions in the literature of international trade. The first thought that comes to mind is that the firm that outsources parts of its own activities necessarily will employ fewer workers. The firm in the textile industry that makes clothes using imported materials must have fewer employees than the firm that do more phases of work, for example weaving and sewing too.

However, neither the definition of offshoring nor its effect is that straightforward. When do we say that the firm is importing goods in order to outsource one or more phases of work? Is it offshoring if the furniture manufacturer buys the wood already processed and painted from abroad? Intuitively, we talk about the firm offshoring part of its production process if in a perfectly closed economy the given firm would produce the goods that are imported in the open economy. Although this definition is useful in terms of economic thinking, it is hard to express or measure it using the data.

So the literature defines the measure of *broad offshoring* as the value of all goods imported by the firm, while the *narrow offshoring* is the value of imported goods that are the products of the industry the firm belongs to. Intuitively, we only want to include those imported goods into the calculations that are the substitutes of the goods which would be produced by the firm in the hypothetical closed economy. As also *Pető* (2012) explains, even the stricter definition might overstate the extent of offshoring; besides, it is obvious that the second measure is sensitive to how narrow we define the industry of the firm.

According to *Grossman and Rossi-Hansberg* (2008) this confusion comes from the fact that – as the name of the phenomenon would also imply – firms are offshoring tasks and activities, not products. This approach, which the authors call *task trading,* throws new light upon the question of drawbacks and benefits of offshoring. First of all, as in the case of trading with goods, offshoring (task trading) means specialization, and because of the economies of scale it increases the firms' productivities in both countries. Furthermore, by delegating certain tasks to partners abroad the firms might be able to procure goods that are cheaper and possibly of better quality than the ones they could produce on their own.

Both mechanisms increase the market share of the offshoring company, also amplifying the demand (and the wages through this) for every type of labor applied in the industry. This effect might even dominate the trivial negative effect that the offshoring implies. That is, for example the firm that only does

sewing may have a higher labor demand than the firm that does weaving as well. In this subsection we examine how much labor receives from the possible surplus caused by offshoring in the form of wage.

Pető (2012) calls the effect of offshoring that works through the growth of productivity the *indirect* effect of offshoring. Even in this case – just as in the models about the trade of goods, where the producers that manufacture the imported products are the losers of the trade liberalization – the demand for the worker's labor that would do the delegated task will decrease. Following the example in the textile industry, after offshoring the firm does not need weavers. Since typically the labor supply is not capable of changing this flexibly, the price of the labor related to this task will be lower in the new equilibrium; that is, the relative wage will decrease. *Pető* (2012) calls this the *indirect* effect of offshoring. This side recieves more attention in the public discourse, because in the developed countries it leads to the further marginalization of unskilled workers.

So to assess the wage effect of imports, our main question is if it ameliorates the growth opportunities of the firm. As we have seen above, in that case the average worker might win with the possibly increased labor demand. The growth and optimal size of a firm is primarily determined by its productivity. So in the following subsection we examine the effect that the import activity has on the firm's productivity. We distinguish between the import of general inputs and intermediate goods (offshoring in the broad and in the narrow sense) from the capital import. While the former ones may allow the firm to produce cheaper, the import of capital goods can be seen as a form of technology import.

Offshoring and the productivity of the firm

Why can a firm that uses imported inputs be more productive? The theoretical literature (*Ethier,* 1982, *Grossman and Helpman,* 1991, *Feenstra,* 1994) distinguishes two separate effects. On the one hand the imported inputs might be of higher quality than their domestically available counterparts at the same price. In this case the firm is able to increase its productivity more with the input from abroad than with the domestic product. (It is also possible that a product of similar quality is much cheaper abroad than at home. From the economics point of view it results in the same effect.) On the other hand there might be some special inputs that are not available domestically at all, and can be substituted only with great loss of efficiency. To give a simple example, a restaurant might substitute the Roman cumin with black pepper but by doing that it will never achieve the same taste.

What do the data tell us about the effect on productivity? *Amiti and Konings* (2007) showed at first on a sample of Indonesian firms that the decrease of tariffs related to imported inputs significantly increases the productivity of the firms. This is consistent with the explanations above, if the decreasing tariffs

increase the use of the imported inputs and through this the firms's productivity. We see for Indian firms that importing companies do not just become more productive, but they also produce a wider variety of products (*Goldberg, Khandelwal and Pavcnik,* 2010). That is, they really increase their size and gain access to new markets.

According to the results of *Halpern, Koren and Szeidl* (2011) also the Hungarian data show that imported inputs significantly increase the firms' productivity. Based on the methodology suggested by *Olley and Pakes* (1996) the first column of numbers in *Table 4.3* presents the estimates of the parameters of a production function augmented with import. Beyond the usual factors of production (capital, labor, raw materials) the import also influences the productivity of the firm. The firms that use imported inputs in the optimal proportion (according to the authors this is 67 percent) are on average $0.78 \times 0.17 = 13$ percent more productive than the ones that do not import at all.

Table 4.3: The productivity effects of import – estimates of the average firm's production function

Dependent variable	Logarithm of the revenue	Logarithm of value added
Capital (log)	0.029***	0.251***
	(0.003)	(0.004)
Labor (log)	0.200***	0.750***
	(0.003)	(0.005)
Materials (log)	0.788***	
	(0.003)	
Per-product import gain	0.174***	
	(0.046)	
Optimal import share	0.666***	
	(0.108)	
Efficiency of imports	1.116***	
	(0.080)	
R&D share of capital		0.091***
		(0.006)
Foreign ownership	0.039***	0.219***
	(0.011)	(0.014)
Industry and year dummies	Yes	
Number of observations	127,374	112,917
R^2		0.788

Note: The definition of the import variables and the parameters see in *Halpern, Koren and Szeidl* (2011). The estimation identifies with the method of *Olley and Pakes* (1996) the differences in productivity using the firm's investment level as proxy. The standard errors are in brackets.

*** Significant at the 1 percent level.

Source: Based on *Halpern, Koren and Szeidl* (2011), and *Halpern et al.* (2012).

By the results of the estimation, given the same prices the imported inputs represent 11.6 percent higher quality than the domestic ones on average. The 40

percent of the whole productivity effect can be attributed to the higher quality of the imported goods, and 60 percent to the imperfect substitution.

Imported machines and firm productivity

How much different is the effect of imported machines? An item of specialized industrial equipment incorporates a serious amount of technological knowledge, and depending on its quality usually allows for a more precise, faster and better quality production process. For example the computer controlled (CNC) lathes are faster and more precise than the manual ones. Moreover, there might be quality differences even between CNC lathes. Surveying managers of Indian metalworking firms *Sutton* (2000) finds that CNC machines imported from Taiwan and Japan are believed to be more reliable and economically efficient than the domestically produced ones. So by importing good quality equipment it is possible to produce at a higher technological level.

How can we measure the quality and technological level of machines? *Halpern et al.* (2012) distinguish the machines imported to Hungary according to the country of origin. Certain countries are very different in the level of research and development in manufacturing and its related industries *(Table 4.4)*.

Table 4.4: The Hungarian machine import according to country of origin

Country of origin	Share of import (percentage)	R&D intensity
Germany	35.9	12.1
Austria	8.8	12.1
Japan	7.6	14.6
Italy	5.5	6.3
United States	3.8	18.2
France	3.4	17.8
United Kingdom	2.5	10.0
Belgium	1.8	9.6
Netherlands	1.4	14.4
Spain	1.4	4.7
Hungary	–	1.2
Total	72.1	12.3

Note: The R&D intensity is the ratio of the expenditure of the firms on R&D and the added value between 1992 and 2003 in the industries with 29–35 NACE codes.
Source: Calculations of *Halpern et al.* (2012) based on OECD and Eurostat data.

For the highest value Hungarian firms buy machines from Germany, where 12.1 percent of the value added is spent on research and development. In Italy the same statistic is 6.3 percent. To compare these values, the expenditure of the Hungarian machine manufacturing sectors on research and development is only 1.2 percent of the value added. Although it is obviously not perfect, the R&D intensity of the country of origin contains some information about the quality of the imported machine.

Halpern et al. (2012) estimate the effect of the imported machines on the productivity of the firm. Since every trade partner of Hungary has higher R&D intensity, it is not surprising that imported machines increase productivity to a larger extent than the domestically manufactured ones. The second column of numbers in *Table 4.3* presents the results of this estimation. (As the dependent variable here is the value added by the firm and not the revenue, the coefficients are not comparable with the first column.) Given the same book value of applied capital (fixed assets) the firm is more productive if it uses machines from countries with a higher R&D intensity. If the average manufacturing firm that has only Hungarian machines was to replace them with German equipment *of the same value*, the R&D intensity of which is ten times higher, the productivity could increase by 20 percent.

The effect of the imports on wages

So both the import of inputs and capital increases the productivity. The increased productivity allows the firm to expand on the market. To satisfy the higher demand, the firm needs more resources; that is, it also demands more labor. The increased demand might result in a higher wage rate – this is the already mentioned indirect effect. It is also possible that the firm needs a special type of labor to operate the foreign machines, to work with the imported input, or because of the offshoring the remaining tasks accommodated by the firm shifts the proportions of the given types of labor required (for example from skilled to unskilled). Either way, the import activity changes the structure of the labor demand, directly affecting the relative wages. This means that the effects induced by capital import and offshoring are different across certain groups of workers (occupation, educational group), so that they also influence wage inequality.

Based on *Pető* (2012) in this subsection we examine through the case of the Hungarian food industry how the imports that are closely related to the company's commercial activities affect the wages of workers having a certain task. The novelty of her approach is that based on 4-digit occupational codes (FEOR-4) *Pető* (2012) is able to identify the effect of offshoring for the different occupations. The usual industry- or firm-level approach of the literature might be deceiving, since they do not take into account that the wages compared before and after the import activity (if offshoring) potentially belong to qualitatively very different parts of the production process.

To enforce an approach that focuses on jobs, *Pető* (2012) categorizes the imported goods of the firms by how closely they are related to the tasks of a worker from a certain occupational group. This is possible because she has detailed universal Hungarian tariff data with 6-digit product codes. The paper distinguishes between three binary variables related to import, following the concepts of narrow and broad offshoring. The first one indicates if the total

import of the firm exceeds a threshold (*import*), the second one signals significant importing activity related to the worker's occupation (*related import;* for example in the case of a butcher any kind of meat), and the third one takes the value 1 if the output of the given task (occupation) is imported by the firm to a substantial extent (*output import,* in the case of the butcher processed chicken).

Table 4.5 shows the estimated parameters of two models from *Pető* (2012). The first is a cross-sectional model estimated by pooled OLS [columns (1) and (2)], the second one is a firm fixed effects model controlling for unobservable characteristics of the firms that are possibly endogeneous. In the latter case we can measure the wage effect only from variation within the firm through time (the wages change after the beginning of the export activity) and through occupations (for example the meat import affects the butchers but not the bakers).

Table 4.5: The effect of imports and offshoring on the wages in the food industry

	Logarithm of gross monthly wage			
	(1)	(2)	(3)	(4)
Import	0.044**	0.047***	–0.005	–0.009
	(0.018)	(0.017)	(0.008)	(0.008)
Related import	0.039**	–	–0.031**	–
	(0.019)		(0.007)	
Output import	–	0.047***	–	–0.014**
		(0.017)		(0.007)
Firm's control variables	size (logarithm of number of employees), logarithm of net revenue, foreign ownership dummy, export indicator variable, region, industry dummies, capital-abor ratio		size (logarithm of number of employees), logarithm of net revenue, foreign ownership dummy, export indicator variable, capital-abor ratio, productivity	
Individual control variables	gender, occupation, education, experience, $(\text{experience})^2$			
Firm fixed effects	no	no	yes	yes
Identified effect	total	total	direct	direct
Number of observations	17,443	17,443	17,478	17,478
R^2	0.78	0.78	0.77	0.77
Number clusters	3,870	3,870	1,285	1,285

Note: The total effect is the sum of the direct and indirect effects. The standard errors are in brackets.
*** Significant at the 1% level; ** 5% level * 10% level.
Source: Based on Tables A3–4. of *Pető* (2012).

As *Table 4.5* shows in columns (1) and (2), the effects of all imports are positive. However, this is not only the aggregate of the indirect and direct effects mentioned above, but includes the effect of the demand shift that follows from the changed set of skills required by the remaining tasks done at the firm after offshoring. For example if a wine producer makes a decision that they will no longer process its plants created by the firm, but rather work with vines created by French food engineers, then the wine makers might have to possess up

until then atypical skills and special knowledge to design a new production process (different timing, temperature, barrels of maturing etc.) that can use the advantages of the new technology (the special, imported types of plants). If this is the case, then the workers with the special skills might expect to receive their share from the extra profit. The regression results show that a worker earns on average 3.9 percent more if the firm imports a product related to his or her task and by 4.7 percent more if some imported goods are the output of the workers task (occupation). At first sight we could interpret these results as evidence that offshoring is beneficial even for the employees working in the directly related occupation. It is necessary to note however, that the wage difference probably contains the effects of self-selection, since in columns (1) and (2) we did not control for firm fixed effects. Also, these coefficients give estimates for the sum of the direct and indirect effects, because this model – unlike the equations following this – does not control for productivity, which is the channel of the direct effect.

Column (3) and (4) in *Table 4.5* controls for firm fixed effects. This time we compare occupations that are affected by imports in the firms with those that are not, as well as wages before and after the start of the import activity. The parameters related to offshoring change their signs and are just as significant as in the first two models. The workers whose firm imports products related to their occupation suffer from a wage loss of between 1.4–3.1 percent. It is important to see as well that the employee whose task is not related to the imported goods does not experience a significant wage drop.

To summarize, regarding the signs of the effects the results meet our expectations and are in accordance with the literature (*Helpman,* 2011): the empirical results show that the workers in the Hungarian food industry are right to be afraid of offshoring in their sector. But this income effect is relatively small, and the results are not necessarily true for other industries. According to *Pető* (2012) the same estimates for the Hungarian textile industry show a positive wage effect because of the productivity increasing effect of the imported goods.[5]

These results lead to further questions. We saw that the import increases productivity, but who gets the surplus from it? The results presented here suggest that the effect of import is heterogeneous regarding different occupational groups. Is there another dimension along which we can observe such heterogeneity? In the following subsections we examine this question.

The effect of international trade on wage inequality

Based on the results presented above we can state that external trade increases the productivity of the firms and that they at least partially share the revenues coming from this enhancement with their workers. However, not every employee is affected by the increased labor demand. In this subsection we examine how international trade influences wage differences. Since the firms that are

5 It is also true that in these regressions we examine the effect on the wages, and for example it is possible that the firm leaves the wages unchanged after offshoring, but terminates jobs; that is, it adapts by adjusting its labor demand.

engaged in international trade are different from the others in several aspects, it is natural that the composition of their labor demand is also different. If as a result of the trade activity the labor demand grows more in those groups of workers that already had a relatively high wage before importing, it leads to an increase in the wage inequality.

Pavcnik and Goldberg (2007) enumerate several mechanisms through which international trade could affect the distribution of wages. We can sort them according to the dimensions (variables) along which they create winners and losers. The simplest dimension is, as we have already mentioned, the level of education. The sign of the effect along education is not that straightforward however. The Stolper-Samuelson effect would imply that the trade liberalization does not necessarily increase the wage inequality (*Stolper and Samuelson,* 1941). This early classical theorem says that as an effect of international trade, the relative wage of unskilled workers grows in emerging economies; in this way the wage inequality decreases in those economies. The reason for this is that in these countries the skilled labor is the scarcer factor, so the economy will specialize in the production of those products that require relatively more unskilled labor, and this increases the demand for this type of workers. There is specialization because it is cheaper to produce the less skill-intensive goods in the developing or emerging countries, while because of the relative abundance of skilled labor the conditions to produce more skill-intensive goods are more favorable in the developed countries (*Feenstra,* 2004, 1–31. p.). Although the Stolper-Samuelson effect is present to a certain degree, according to the larger share of the literature the data do not support its primary importance. For example while analyzing Argentinean data from the time of the trade liberalization related to the creation of Mercosur *Bustos* (2011) finds a significant effect with the opposite sign: as a result of the liberalization the wages of the skilled workers grew more than the wages of the unskilled workers.

The model of offshoring from *Feenstra and Hanson* (1997) might give an explanation for the empirical facts contradicting the classical theorem, because in that model the tasks that are not skill-intensive in the developed country (and being offshored) belong to the skill-intensive tasks in the developing country because of the big technological gap. This way from the point of view of the developing country the demand for the skilled workers will increase. *Acemoglu* (2002) and *Koren and Csillag* (2011) argue that usage of advanced technologies requires higher education and better skills from the average worker. This implies that in mechanisms stressing the connection between trade and technology import, imports induce skill biased technological growth through their effect on productivity. The most straightforward example for such a mechanism is the import of capital goods (machines), since this can be regarded as direct technology import; we will examine this channel in detail below. But the earlier example of the wine maker also belongs to this group of mechanisms;

when the imported input is of better quality, and the handling of it requires a higher level of knowledge during the production process. In the literature we can also find examples for the export activity causing an urge to improve on the quality of the product, which in turn requires higher skills and level of knowledge from the workers (see *Verhoogen,* 2008 for details). Although the results in these papers taken one by one are very plausible, unfortunately the econometric identification of the effects of the export/import induced skill biased technological growth is very problematic. As *Spitz-Oener* (2006) describes, one of the most important obstacles is that it is vital to enforce the above mentioned approach that puts the occupation (the tasks in fact) into the focus of the identification strategy (see also in *Pető,* 2012).

The second dimension along which the heterogeneity in the wage effect of import might be significant from the point of view of wage inequality is the employee's place in the firm's hierarchy; that is, how many managerial tasks the employee has. This dimension appears as occupation in the data. The literature on this topic is much smaller and recent. Here the basis of the heterogeneity is that the managers have special tasks, which are inherently different from the work of the machine operators for example.

It would not be unrealistic to make the hypothesis that the managers get the extra profit from the increased productivity. *Tóth* (2011) argues that it is also possible that we will find the wage surplus related to import at the lower levels of management (supervisors) – thanks to their private information regarding the production process as direct supervisors. At the same time *Eaton et al.* (2009) present some evidence that since the top managers initiate the import activity, and they also play a decisive role in establishing a trade relationship, which task requires their specific skills, they should be the ones who benefit from the extra trading profit.

The demand for skills

One criterion that the literature finds important from the point of view of the effects of international trade is the quality of the labor force. In the countries where human capital is abundant international trade necessarily increases the demand for skilled labor. But from the point of view of the classical theoretical literature it is surprising that according to the results presented the developing countries experience the same, even though skilled labor there is a relatively scarce resource.

As *Koren and Csillag* (2011) argues, the increase of the demand is a direct effect of the import. As we saw already, imported machines represent a higher technological level than the domestically produced ones. This means that the worker needs more education or more work experience to operate them as well. That is, the machine import increases demand exactly for those workers who are already valued higher by the labor market.

Let us consider those workers whose occupation includes operating some industrial equipment. Machine import might have a very direct effect on them, since they come into contact with it through their everyday work, not only through the increase of the firm's productivity. The exact classification of the employees' occupations and the detailed classification of the imported goods makes it possible to measure the import exposure more accurately. For example "printing machine operators" are directly affected by the import of offset import machinery, but not by the import of "metal lathes", maybe only indirectly.

We find 99 thousand machine operators in the *Wage Survey* between 1994 and 2004. 39 thousand of them have worked for a firm that has imported machinery earlier that can be linked to their occupation. They earn 20 percent more on average compared to other workers who have the same occupation and are not exposed to imports (*Koren and Csillag,* 2011, Table 1 and 2). But this wage difference might be attributed to other differences between firms (the importers are larger, more likely foreign-owned and more likely to export). To identify the effect of machines on labor demand we need to control for more firm and individual control variables.

Column (1) in *Table 4.6* shows the results of a linear regression that regresses the logarithm of the wage on the import variable (now only taking into account the machine import), besides having the size of the firm, an indicator of foreign ownership, occupation (4-digit FEOR) and year dummies, respectively the gender, age and education of the worker as control variables. (We do not present the coefficient of the control variables.) After accounting for the effect of these variables there only remains a 10.5 percent wage difference between the wages of the machine operators who work for an importer firm and who are employed by a non-importer firm.

In column (2) of *Table 4.6* we distinguish the general machine import from the machine import related to the individual's occupation. If for example a printing machine operator works at a company that imported a metal lathe, then the worker gets on average a 5.5 percent higher wage than the printing machine operators that work for firms that do not import machines. This can be the result of the self-selection of the firms, but also the indirect effect of the import. If on the other hand the firm of the worker imports a printing machine, then the operator receives a 5.5 + 8.2 = 13.7 percent higher wage compared to other workers with the same attributes whose firms do not import industrial equipment. The 8.2 percent difference is the direct effect of machine import. The wage difference can be attributed partly to the different educational background and partly to the increasing return to education. The wage premium of secondary education[6] among workers who operate domestically produced machines is 6.9 percent. In the group of workers who work on imported machines the same surplus is 11.3 percent (first column of Table 6. in *Koren and Csillag,* 2011). That is, the return on formal education is higher on the imported equipment.

6 The average wage of high school and vocational school graduates relative to the wages of workers with primary school education

Table 4.6: The effect of machine import on the wages of the machine operators

	Logarithm of gross wage					
	(1)	(2)	(3)	(4)	(5)	(6)
Machine import related to occupation	0.105***	0.082***	0.028**	0.032**	0.053***	0.004
	(0.012)	(0.013)	(0.013)	(0.013)	(0.016)	(0.016)
Import of any machine	–	0.055***	–	-0.019	–	–
		(0.013)		(0.017)		
Machine import related to occupation, with high levels of R&D	–	–	–	–	0.72***	0.036**
					(0.016)	(0.017)
Firm control variables	logarithm of number of employees, foreign ownership status					
Worker control variables	occupation (FEOR-4) and year fixed effects, gender, high school education indicator variable, age, age-square					
Number of observations	543,175	543,175	32,549	32,549	543,175	32,549
R^2	0.404	0.409	0.862	0.862	0.404	0.862

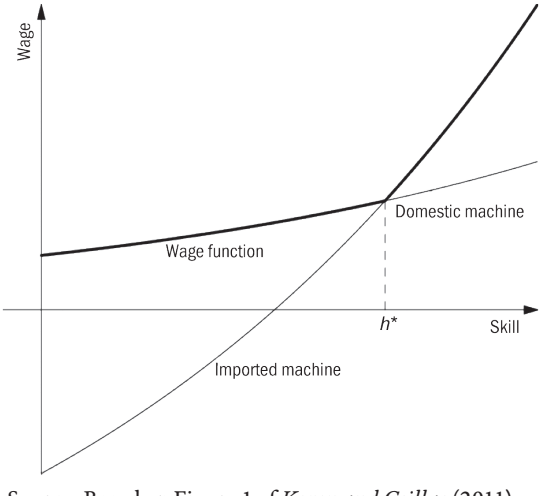
Note: We do not present the coefficients of the control variables of the firm and the worker. The coefficients of columns (1), (2) and (5) are estimated by pooled OLS, models in columns (3), (4) and (6) have panel fixed effects. The brackets contain the clustered standard errors (by firms).

*** Significant at the 1% level; ** 5% level * 10% level.

Source: Based on Table 4. and 5. in *Koren and Csillag* (2011).

However, education explains only a small part of the relevant skills of machine operators. We cannot measure the effect of on-the-job training, job experience or the original differences in skills and abilities. If the marginal revenue produced by these skills is higher when working on imported machines, then the firm obviously will assign the more skilled worker to those machines.[7]

Figure 4.6: The marginal product of skills on imported and domestic machines



Source: Based on Figure 1 of *Koren and Csillag* (2011).

Figure 4.6 demonstrates a framework in which we can think about this issue; it depicts the possible wages of workers with different skill levels if they work

7 See for example about the selection of the workers using computers *DiNardo and Pischke* (1997) and *Entorf, Gollac and Kramarz* (1999).

on domestic or imported machines. Workers aim for the highest wage, so they will work on the machine that comes with the higher wage curve. The productivity (and this way the wage) is increasing in conjunction with the skills on both types of machinery, but their return is higher on the imported ones. So above a given h^* skill level every worker works on imported machines, below that level everybody operates the domestically produced equipment.

How can we control for the effects of unobservable skills? In the *Wage Survey,* due to the lack of a worker identification variable the individuals cannot be followed through the years, but they can be assigned into groups based on their age, gender, education and occupation; then we can measure the changes in the average wages of these groups. We can compare for example the wages of a female machine operator in the textile industry with a high school degree and born in 1948 within the firm before and after the import activity. Since these groups are rather homogeneous (sometimes they contain only one observation), using the differences calculated above it is possible for the most part to control for the effects of unobserved skills.

The results of this within-group estimation is presented in columns (3) and (4) of *Table 4.6* We find that after the purchase of the imported machine wages increase by 3 percent on average in these groups; that is, the causal effect of the imported equipment is around this value. The detailed structure of the import data makes it possible to take a closer look at the effects on wages. Namely, the R&D intensity of the countries of origin might be substantially different. In the models (5) and (6) in *Table 4.6* we distinguished the imports from countries with high R&D intensity.[8]

The wage effect of the import coming from these countries is much higher; 60–90% percent of the whole wage surplus can be attributed to the high R&D. This is consistent with the argument that the machine imports affect the wages through the technology they represent.

In a simple model *Koren and Csillag* (2011) also investigate the general equilibrium effects of the imported machines. As the price of the machines decreases due to the trade liberalization, more and more firms start to import. The productivity of the machine operators working at these firms increases, and they receive higher wages than before, but those operators who have been working on imported machines for some time experience an increase in wages as well. The reason for this is that the machine required for their work became cheaper and more available, so they too would have more opportunities on the labor market. By raising the wage the firm can prevent those skilled machine operators who have been working with imported machines for a more extensive period from quitting. This effect can be easily observed in the data: In the occupations where the ratio of machine operators working with imported equipment grows faster, the wage premium of these workers increases faster as well. If for example the ratio of workers using imported machines grows by 10%, it will

8 Those countries belong to this group that are among the top ten in the R&D ranking of the OECD: Sweden, Norway, Japan, Belgium, South Korea, Finland, Germany, Denmark, the United States and the United Kingdom.

increase the wages of the machine operators who have already been working with imported capital by 0.5 percent compared to employees from the same profession (*Koren and Csillag,* 2011, Table 7, column 2).

The demand for managers and other occupational groups

In this section based on *Tóth* (2011) we examine if the effect of importing machines has a different effect on the groups of managers and production workers, and if so, who gets the premium for the import activity. While there are many papers on the heterogeneity of wages across educational groups, the literature pays much less attention to the variation due to workplace hierarchy or occupations in general. The topic is especially relevant for Hungary, because after the transition to the market economy – with the increasing number of firms – the number of management positions rose suddenly and the roles of the managers also changed in the production process. In the market economy there was an increased need for managers who were able to cope with (new) managerial tasks. This period also played an important role in shaping today's wage distribution in Hungary, so it is an interesting question as to how much the trade liberalization contributed to the jump in the income of people at the top of the hierarchy. *Tóth* (2011) examines the wage effect of export and import in four groups of employees: top managers, departmental (middle) managers, supervisors and other production workers. (The categorization of the employees is based on their 4-digit FEOR code.)

As we argued in the last section, the possible positive wage effect of international trade may be attributed to any of the managerial groups. Because either the employee plays a vital role in realizing the potential productivity enhancing effect of international trade (middle manager), or his/her special skills and social network is important in establishing a profitable relationship (top manager), or simply (s)he can enjoy some sort of informational rent as a direct supervisor of the production.

Similarly to the papers mentioned earlier, *Tóth* (2011) also uses a merged data set from the *Wage Survey* and the *Customs Statistics* for the years between 1994 and 2003. Using 4-digit occupation codes the author is able to match the employees to the right managerial category. Exporters are the firms whose export constitutes at least 10% of their revenue, and the indicator variable for capital imports takes the value 1 if the firm has ever imported a valuable machine needed for production. *Tóth* (2011) estimates the wage effect of the export and import with a Mincer-equation for each managerial group separately; the wage premium is the coefficients of the *exporter* and (capital) *importer* variables. There are firm-level (size, region) and worker-level control variables (gender, educational background, experience), and the paper estimates pooled OLS and firm fixed effects regressions. In this latter case the coefficients of the *import* and *export* variables are meant to measure the increase of the wages af-

ter the start of exporting and importing. Lastly, *Tóth* (2011) re-estimates the regressions for each year. In the following paragraphs we summarize the main conclusions drawn by the author from the results.

In order to get comparable results with the literature *Tóth* (2011) estimates the wage effect of the export without including the variables for import activity and foreign ownership in the regression. The wage premium of export is sizable in every managerial category (4–21 percent), and is significant at every conventional confidence level (*Tóth,* 2011, Table 7.1.). According to the regressions the higher the employee is in the managerial hierarchy, the stronger is the positive wage effect of the export. These results fit in the picture described by *Bernard et al.* (2007), but they practically collapse if we put the other two indicator variables denoting international involvement in the regressions. In this case the wage effect of export is not significantly different from zero anymore (see *Table 4.7*). This suggests that it is not the export that is related to a premium but the import activity. This corresponds to the results cited in the previous sections, according to which it is a questionable view that the export is the key for technological growth and every import activity is suspicious.

Table 4.7: The effect of import and export on the wages in various occupational groups (cross-section results)

	Log wage			
	production workers	supervisors	middle managers	top managers
Exporter	–0.00281	–0.0412*	–0.0328	–0.00564
	(0.0100)	(0.0242)	(0.0331)	(0.0445)
Capital importer	0.0763***	0.129***	0.139***	0.0755**
	(0.0115)	(0.0213)	(0.0418)	(0.0359)
Foreign ownership	0.197***	0.249***	0.348***	0.475***
	(0.0161)	(0.0257)	(0.0429)	(0.0563)
Worker characteristics	yes	yes	yes	yes
Firm characteristics	yes	yes	yes	yes
Firm fixed effects	no	no	no	no
Year fixed effects	yes	yes	yes	yes
Number of observations	501,590	33,155	8,712	6,928
R^2	0.740	0.663	0.613	0.554

Note: We do not show the coefficients of individual and firm-level control variables. The worker-level control variables: *occupation* (4-digit FEOR), (employment) *experience, experience*^{2}, *educational background*, *gender*. The firm-level control variables: *size* (number of employees), *region*. Estimation method: OLS. The firm clustered standard errors are in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

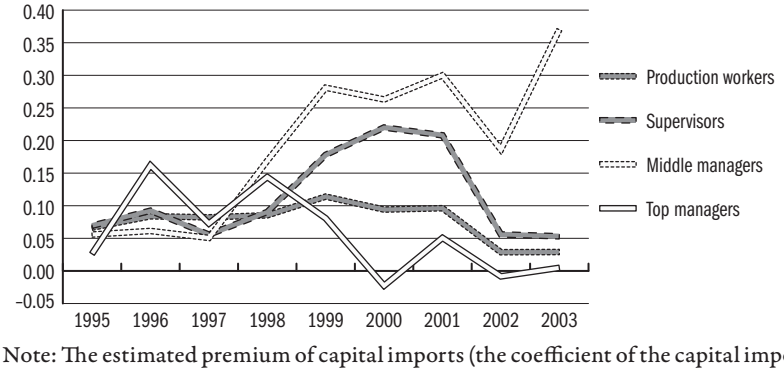
Source: Based on *Tóth* (2011) Table 7.1.

We can state that the import, if it represents a more advanced technology (for example the capital import from the United States), has a positive premium not only with respect to productivity but in the wages as well. How does the

capital import affect wages in the various occupational groups? As *Table 4.7* shows, the import variable is always significant, its coefficient reaches its peak around 13–14 percent in the regressions of supervisors and middle managers, while the wage premium of import in the group of top managers and production workers is around 7.5 percent. This gives an inverted-U shaped pattern, that is, the middle managers and supervisors get more from the surplus generated by the import activity. We can interpret this as the market rewarding the specific skills of these managers, like being able to reshape the production process so that the opportunities offered by the imported capital can be realized. This mechanism is emphasized by *Tóth* (2011) and partly by *Mion and Opromolla* (2011) as well. Another result related to this is from *Caliendo, Monte and Rossi-Hansberg* (2012). Their model shows that just like the contraction or expansion of a firm, international trade activities are also followed by reorganizing the managers' hierarchy.

Tóth (2011) runs the same regressions separately for each year in the sample, so that we can have an idea how the wage effect of import evolved over time. *Figure 4.7* shows the import premium in each managerial group; the coefficients are from regressions that – besides the mentioned factors – also control for the capital-labor ratio of the firm. Putting this variable in the regression (along with other variables that are correlated with the import status) is important to control for endogeneity, but at the same time it can be an important channel for the effect of the imports on productivity,[9] that is the reason why it is not in the baseline model (*Table 4.7*). Surprisingly, the coefficients from these regressions show the above mentioned pattern in wage premia even more clearly.

Figure 4.7: The wage effect of export and capital import for each occupational group and year (cross-section results)



Note: The estimated premium of capital imports (the coefficient of the capital import indicator variable) for each year from 1995–2003; the model of *Table 4.7* was used without the time fixed effects, but we also controlled for the capital-labor ratio (that reinforces our results).
Source: *Tóth* (2011), Table 6.

9 For example imported machines are more expensive and delicate to handle, so the supervisor just makes the worker take more care during work.

The results described above are also based on data from the years after 1998; until that year it is not straightforward which occupational group profited the most (if at all) from the capital import. The 1998 boundary is close to the time determined by *Kézdi* (2002) when the first period of the transition of the Hungarian labor market characterized by inter-sectoral reallocation ended. As *Tóth* (2011) explains this phenomenon, probably the reform rush of the transition, the effect of the radical institutional changes of the Hungarian economy can be seen on the magnitude of the coefficients from the regressions of the first years.

Conclusion

In this paper we showed that international trade – especially import – has mostly a positive effect on wages. Not everybody gains equally, and we found example of a wage decrease as well, but the primary effect tends to increase wages. What is the economic policy that could exploit these opportunities to increase income?

First of all, only a small share of the firms participates in international trade, despite the fact that this would generate a significant productivity growth on the micro-level as well. Especially small firms have limited international connections. With targeted information and financial support campaigns the participation rate could be increased. It is important however, that the policy should not only focus on helping with the launching of a product on the external market and increasing the competitiveness of export, but also needs to help the firms to access the potential partners for import. The majority of small firms are probably not aware of the opportunities related to imports, how much they could reduce costs and what kind of organizational and technological changes are needed to realize these gains. In the light of the results cited above, we would especially recommend giving firms incentives to import machines with more advanced technology.

Secondly, we saw that imports have a particularly sizable effect on the wages of skilled labor and lower-level managers such as supervisors and middle managers. Often technology import is the only opportunity for an employee to work with cutting-edge technology, and acquire skills related to it. We did not study the long-run and general equilibrium effect of import that potentially increases the average skill of workers, but we think it is important that the economic policy should help this mechanism instead of hindering it. Moreover, the negative wage effects that are associated with unskilled workers should be mitigated with targeted policy measures not with trade discrimination.

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INSTITUTIONAL ENVIRONMENT OF THE LABOUR MARKET BETWEEN SEPTEMBER 2011 AND AUGUST 2012

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INTRODUCTION*

The chapter on the institutional environment of the labour market was presented in a new format for the first time last year and again this year it will also follow a similar structure. Our aim was to describe policy interventions using the same set of categories – which also allows temporal and international comparisons (*Busch–Cseres-Gergely,* 2012). The categories were based on the *Labour Market Policy* (LMP) classification of Eurostat and the LABREF database of the Directorate General for Economic and Financial Affairs (DG ECFIN), European Commission. Interventions are categorised in the following groups (the numbering of sections throughout this chapter follows the numbering below).

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Target groups of labour market policies (LMPs)

LABOUR MARKET POLICY (LMP) INTERVENTIONS

Services

1. Employment services

Measures

2. Training
3. Job rotation and job sharing
4. Employment incentives
5. Supported employment and rehabilitation/integration of people with partial work capacity
6. Direct job creation
7. Start-up incentives

Supports

8. Out-of-work income maintenance and supports
9. Early retirement

Mixed interventions (complex programmes)

Policy measures with an indirect effect on the labour market

LABOUR MARKET RELATED POLICY MEASURES, EXCLUDING LABOUR MARKET POLICIES

10. Labour taxation
11. Other transfers
12. Contractual terms of employment
13. Old age and disability pensions system – disability supports
14. Wage bargaining and wage regulation
15. Migration and mobility related measures
16. Institutions for the management and evaluation of employment policy

The chapter provides an overview of all labour market policy interventions that entered into force in the period studied–the period between September 2011 and August 2012. The current chapter builds on last year's overview, therefore it does not present the definition of categories or the expected impact of interventions, and neither does it discuss the *status quo* in most cases. An exception is the section on the revised Labour Code that provides a detailed discussion about the significance of the changes. Related legislation is provided in a separate section with a view to accurate referencing and access – this is especially important for the in-depth understanding of changes. Similarly to last year, changes are discussed in relation to each of the categories. There is a new addition to the chapter: a section on the financing of employment policy and this is presented at the end of the main text. This section provides an overview of the main methodological challenges of estimating the budget of employment policy and data for 2011. The objective remains the same: to provide an instrument to those who are seeking to understand and analyse changes rather than evaluate the policies. Although a number of policy makers were consulted in different areas, the main source of information remains the *Hungarian Official Journal*, as well as the collection of current legislation.

LABOUR MARKET POLICY MEASURES

The foundations of the Hungarian labour market policy were laid down by Act IV of 1991, commonly known as the Employment Act. The policies set out by the Act are commonly referred to as employment policy measures in the Hungarian technical terminology.

Services

1. Employment services

A) Services of the National Employment Service (NES, in Hungarian: Nemzeti Foglalkoztatási Szolgálat, NFSZ)

There were no changes during the period studied; the government decree on the statute of the NES reaffirmed its role in terms of the provision of services. All services were available at local job centre offices throughout the period studied.

B) Other activities of the National Employment Service

The role of the National Labour Office (in Hungarian: Nemzeti *Munkaügyi Hivatal)* was amended to include, in addition to its existing responsibilities, labour inspection, occupational health and safety and tasks that the Act on Adult and Vocational Education and Training originally had delegated to the Adult and Vocational Education and Training Body (for changes related to vocational training see Section 2). In parallel to these changes a significant layoffs at the

affected institutions took place: the total number of staff was reduced by 239 in 2012. There were significant changes in the role of the employment service and local job centres as well. For example job centres are now responsible for managing community service for offenders who have committed misdemeanour offences.

Main legislation

Government decision 1413/2011 (1 December) on the re-structuring of employment services; Government decree 111/2011 (4 July) amending certain government decrees on the role and responsibilities of municipal and county government offices; Government decree 323/2011. (28 December) on the National Labour Office and the role and responsibilities of the public bodies under its management; Government decree 324/2011 (28 December) amending certain government decrees relating to the establishment of the National Labour Office; Ministry for National Economy decree 42/2011 (2 December) on the sphere of responsibilities of (Budapest) county job centres; Ministry for National Economy (MfNE) decree 3/2012 (10 February) amending certain ministerial decrees relating to the establishment of the National Labour Office; Ministry of National Development decree 19/2012 (26 April) amending certain ministerial decrees relating to the establishment of the National Labour Office; Government decree 250/2011 (1 December) amending certain government decrees relating to the implementation of occupational health and safety legislation; Act XXXI of 2012 amending Act II of 2012 and certain relating acts on misdemeanours, misdemeanour procedure and the registration of misdemeanour and certain acts relating to disaster protection.

On-line resources: munka.hu

Active labour market policy measures (LMP measures)

2. Training[1]

1 This section is based mainly on *Odrobina* (2012).

Changing financing and institutional arrangements in vocational education and training

The financing and institutional framework for vocational education and training changed significantly as of January 1, 2012. In the new regulatory framework, contrary to the previous system, employers cannot spend the vocational training contribution on the training of their own employees. At the same time, however a significantly larger amount of European Union financing was made available for workplace training – see also Section 10 on taxation and the section on the financing of employment policy at the end of the chapter. Vocational training contribution provides financing for vocational education and training as well as vocational-type training programmes in schools or in the adult learning system for up to 100% of the costs. The revenues also finance public capital investment for vocational education and training (for example construction workshops) and stipends for apprentices in shortage occupations. The remaining sum is allocated to vocational education and training institutions via a decentralised system of tenders.

The financing of school-based training also changed: the previous cost-based system is being replaced by normative block-funding – 440,000 forints per student per year in 2012. The rate is to be set by the budgetary act each year.

The rate of the income replacement allowance payable to job seekers taking part in training has changed and it will be paid according to the public works wage rather than the minimum wage.

Renewed OKJ – detailed rules and content for modules

The National Register of Qualifications (in Hungarian: Országos Képzési Jegyzék, OKJ) was revised. The aim was to streamline the system and eliminate overlapping vocational qualifications as well as creating a solid foundation for basic skills. In line with the modular character of the OKJ, the list and content of each module was published in relevant government decrees. The content of vocational qualifications is set out by ministerial decrees based on these modules.

Main legislation

Act CLXXXVII of 2011 on vocational education and training; Act CLV of 2011 on the vocational training contribution and the development of vocational education; Government decree 280/2011 (20 December) on normative funding rates for apprenticeships and other discounts that can be used to calculate the rate of the vocational training contribution; Government decree 150/2012 (6 July) on the National Register of Qualifications and governmental procedures for the revision of the National Register of Qualifications; MfNE decree 27/2012 (27 August) on the vocational and examination requirements of vocational qualifications under the authority of the minister for national economy.

On-line resources: munka.hu; tkki.hu

3. Job rotation and job sharing

There were no changes in the area of job rotation and job sharing.

4. Employment incentives

Changing Start cards

The most important change in the area of employment incentives was the transformation of the Start schemes, previously financed by the contribution of employees and offering targeted contribution assistance. Although Start-extra and Start-plus cards issued earlier remain valid, after 1 January, 2012 only Start Bonus and Start cards can be issued. Eligibility and the claims process for the new schemes are similar to those of previous Start schemes.

To be eligible to claim a Start Bonus card individuals must:

– be registered as job seekers for at least three consecutive months leading up to their claim, or
– take up paid employment within a year (365 days) after claiming parental benefits or carer's allowance, or
– take up paid employment after the first birthday of their child while still claiming child care allowance, and

– be out of work, and
– aged under the retirement age, and
– not be in possession of a valid Start, Start-plus or Start-extra card.

The Start Bonus card provides a tax allowance for employers from the social contribution tax that replaced the national insurance contribution. The rate of the tax relief is 27% of the pre-tax wage and this can be applied to wages up to 150% of the minimum wage in the first year of employment. Employers can draw on the tax relief if the employment period is longer than 30 days and the working time is no less than four hours per day.

The card is valid for one year after the date of issue, but up to the retirement age of the card holder. Individuals who have claimed parental benefits or carer's allowance are eligible to claim a Start Bonus card more than once – under certain conditions stipulated by the regulation – after each period they have claimed any of these benefits (i.e. if they were on parental leave more than once etc.). However people who are using a Start Bonus card while claiming child care allowance cannot be issued a new card after its expiry if they remain in employment after the payment of their child care allowance had seized.

Wage subsidies – more people will access and be eligible for them

In terms of wage subsidies, both the scope of eligible employers and employees was extended. Social cooperatives are newly eligible employers that can receive assistance of up to 70% of the pre-tax wage. Some of the previous restrictions on the eligibility of employees were lifted: people under 25 years do not need to be new entrants to qualify for wage subsidy, people registered as job seekers for six months or longer do not have to undergo a work readiness test and the category of long term jobseekers for 24 months has been abolished. However, jobseekers who live with their family are only eligible if the other family members are not in employment.

Contribution relief for people with partial work capacity

A new form of subsidy for workers with partial work capacity introduced in 2012 was the *rehabilitation card* that exempts employers from the social contribution tax on wages of up to twice the minimum wage. People who were receiving group 3 disability pension or regular social assistance on 31 December 2012, or were assessed as suitable for vocational rehabilitation or employment with long-term subsidy after 1 January, 2012 are eligible for the card. People within five years from state pension age and those who were receiving group 1 or 2 disability pension on 31 December, 2012 are not eligible.

As of 1 July, 2012 people with partial work capacity who are self-employed or individual members of a business are also exempt from the payment of social contribution on their income.[2] Its rate is equal to the discount provided by the rehabilitation card. It should be noted that as of 2012 the assistance is paid on the basis of potential employability for employees, however for employers in the latter group it is paid according to the degree of impairment.

2 And further groups set out by the Act as eligible.

As of 2012 employers with a minimum of 25 employees must meet the employment quota for disabled workers as opposed to the previous limit of 20

employees. Workers with partial work capacity are counted in the quota if their loss of work capacity is at least 50% or the degree of their Whole Body Impairment is not less than 40%. For any unfilled quota employers must pay a penalty of HUF 964,500 per position per year.

Job protection and creation: no changes. Wage compensation

There were no changes in the area of job protection and job creation subsidies. However a number of new tax credit schemes were created to counter the effect of new income tax regulations that can be regarded as a form of job protection subsidy because they have a similar effect – although they are implemented differently. The intervention protects those already in employment and keeps the non-employed out of the labour market through the effect of expected pay increase that prevents wage adjustment. This is discussed in more detail in Section 14 on *wage negotiation and wage regulation*.

Main legislation

Government decree 69/2012 (6 April) on assistance to maintain the real value of wages (wage compensation assistance), and amending the Government Decree on the expected rate of wage increase to maintain the real value of wages in 2012 and the value of non-wage payments that can be included in this.

On-line resources: munka.hu

5. Sheltered employment and vocational rehabilitation

There were changes in both the regulation and institutional framework of vocational rehabilitation and health impairment assistance in the period studied.

People with partial work capacity who have been found suitable for vocational rehabilitation by the comprehensive assessment, can qualify for rehabilitation assistance. This new form of assistance replaces a range of previous benefits including the rehabilitation allowance, disability and accident-related pensions, regular social assistance, temporary assistance and the health impairment allowance of miners – see also Section 13 on old age pensions.

New network of institutions: rehabilitation management authorities

The National Office for Rehabilitation and Social Affairs (in Hungarian: Nemzeti Rehabilitációs és Szociális Hivatal, NRSZH) was established on 1 January, 2011 and is responsible for the accreditation of companies employing people with partial work capacity and the administration of public assistance and subsidies (in the case of wage subsidy for vocational rehabilitation this is limited to technical assistance).

On 1 July, 2012 a network of new rehabilitation management authorities was established under the supervision of the NRSZH and under the scope of municipal and county government offices. Their area of competence are identical with those of government offices (includes Pest county in Budapest). Tasks previously carried out by three different authorities (NRSZH, government offices and jobcentres) have been delegated to the new rehabilitation management authorities from 1 July, 2012. National Pension Insurance directorates remain responsible for the payment of rehabilitation benefits.

The 19 rehabilitation management authorities operate in approximately 100 local offices (customer services) with 620 staff. Their main objective is to help people receiving rehabilitation assistance to return to the labour market. They provide the same range of services that the employment service provides on the basis of Ministry of Economy decree 30/2000 (15 September). For job brokerage services they use the database of job centres.

People claiming rehabilitation assistance must take part in public works if their health status allows. Vocational rehabilitation and sheltered employment are financed from wage subsidy and cost compensation appropriations set out in the budget act. These were 11.7 billion forints and 24.5 billion forints respectively in 2012. The NRSZH will be the beneficiary of the new SROP Project 1.1.1 that will be implemented in cooperation with the rehabilitation management authorities. The other EU-funded programme – that is coming to an end – is still managed by the employment service.

Main legislation

Act CXCI of 2011 on assistance for people with partial work capacity and the amendment of certain acts; Government decree 327/2011 (29 December) on procedural rules for assistance to people with partial work capacity; Ministry of Human Resources decree 7/2012 (14 February) on comprehensive assessment; Ministry of Human Resources MHR decree 8/2012 (21 February) on vocational rehabilitation experts; Government decree 95/2012 (15 May) on the National Office for Rehabilitation and Social Affairs and the responsibilities and jurisdiction of rehabilitation management authorities under its management; Government decree 238/2012 (30 August) amending Government decree 177/2005 (2 September) on public assistance to the employment of people with partial work capacity.

On-line resources: nrszh.kormany.hu; kormany.hu

6. Direct job creation

The fine tuning of the public works scheme continued

The largest active measure of current Hungarian labour market policy – similarly to the previous year – is employment in public works (see also Section 16 on financing and funding priorities). This includes short- and longer term public works, national public works projects and Start-work demonstration projects at the level of small regions. The main features of the programme remained by-and-large unchanged apart from working time which increased more than four hours per day in the majority of projects in 2012 – based on experiences from 2011. It also includes mobility assistance for public works as well as assistance for businesses to employ people claiming out-of-work assistance [the actual Hungarian benefit is called "foglalkoztatást helyettesítő támogatás" (fht), translated as Employment Replacement Support]; however neither of these has been claimed (in the first case the incomplete regulatory framework might have contributed to this). Public works programmes continue to be managed

by the Ministry of the Interior, the Ministry for National Economy is responsible for managing the public works appropriation of the National Employment Fund (in Hungarian: Nemzeti Foglalkoztatási Alap, NFA; previously the Labour Market Fund, LMF in Hungarian: Munkaerő-piaci Alap, MpA) and undertaking financial commitments, and job centres are responsible for the contracting and payment of public works employers and employees. Funding comes from the public works appropriations of the National Employment Fund, and the appropriations of the SROP 1.1.2/1.1.4 programmes – for related training programmes. The demonstration programmes that had started in 2011 continued in 2012: in the 94 small regional Start-work demonstration programmes more than 1,600 settlements and approximately 66,000 workers participated in the first eight months of the year (National Labour Office data). There are seven different types of public works programmes that local councils can take part in:

1) Agricultural projects – animal husbandry, crop cultivation or both (provision of machinery, seedlings, polytunnels etc. for participants),
2) Maintenance of dirt roads used for agricultural purposes,
3) Drainage,
4) Clearing up illegal landfill sites,
5) Organic and renewable energy production (for example switch over to bio boilers, the production of grass, shrub and log briquettes etc.),
6) Maintenance of public roads,
7) Winter and other "meaningful" employment (for example preservation, drying and pickling of vegetables and fruits, making pasta, maintenance of local council buildings etc.).

Agricultural programmes run throughout the year while other programmes typically last for five months. One person can participate in only one programme at a time. The deadline for local councils to set up new Start-work demonstration projects was extended until 1 July, 2014.

Changes in legislation make it possible for Start-work demonstration projects (mainly agricultural projects) to become self-supporting and establish social cooperatives, and under certain conditions equipment purchased in demonstration projects can be transferred to social cooperatives. Currently the aim is to establish social cooperatives over the next two years; the elaboration of details is still underway. There are approximately 300 social cooperatives in Hungary and around 40 demonstration projects might become self-sustaining and turn into social cooperatives in the future.

Main legislation

Act I of 2012 on the Labour Code; Government decree 375/2010 (31 December) on assistance for public works programmes; Act CVI of 2011 on public works and on the amendment of public works related and other legislation; Government decree 169/2011 (24 August) on the Employment and Public

Works Database; Government decree 170/2011 (24 August) on wage setting and guaranteed wage in public works employment.
On-line resources: belugyminiszterium; nfsz

7. Start-up incentives

There were no significant changes in the regulation of start-up incentives.
On-line resources: munka.hu

Supports

8. Unemployment (job seeker's) benefits and assistance

Minor changes in the conditions of job seekers' benefits

There were significant changes in the characteristics and rates of job seekers' and social benefits awarded after 1 September, 2011 – this was discussed in detail in last year's volume of the *Hungarian Labour Market* (*Busch–Cseres-Gergely,* 2012, Table 2). Changes in the current period mainly resulted from changes in related regulations, such as increases linked to changes in the statutory minimum wage or minimum pension. Nevertheless the rate of out-of-work assistance and regular social assistance (RSA) was reduced and eligibility criteria for job seekers' allowance were tightened. Eligibility criteria for pre-retirement job seeker's allowance were somewhat relaxed. The situation at the end of the period is summarised in *Table 1.*

Table 1: Main characteristics of job seekers' and working age benefits, as at 30 August, 2012*

Type of assistance	Eligibility criteria	Rate
Job seeker's allowance (paid for a minimum of 36 and a maximum of 90 days)	At least 360 *qualifying days* within three years** 10 qualifying days correspond to one day of benefit payment	Sixty per cent of the wage on which labour market contribution is paid but up to 100% of the minimum wage on the first day of benefit payment: *93,000 forints/month, 3,100 forints/day*
Pre-retirement job seeker's benefit	Within five years from pensionable age, has received job seekers' allowance for at least *45* days and exhausted entitlement and within three years from eligible age, has enough qualifying years for old age pension and is *not receiving any pre-retirement benefits, perpetuity for retired ballet dancers and benefits for ex-miners.*	Forty per cent of the minimum wage: *37,200 forints/month, 1,240 forints/day.*
Out-of-work assistance	People of working age can qualify for this if they are not eligible for regular social assistance. At least 30 days of employment or participation in labour market programmes, accepting any job offers regardless of the level of qualification required and keeping their own local environment tidy, if required by the local council.	*Eighty per cent of the minimum* old age pension, *22,800* forints/month
Regular social assistance	No significant changes	Depends on family income *but up to 42,326 forints/month, if family member is receiving out-of-work assistance the maximum amount of RSA can be 19,526 forints/month*

* Italics indicate changes from 2011.
** Qualifying days are any days in employment, self-employment or as an individual member of a business provided that contributions have been duly paid.

The following minor changes are entering into force:

1) The period for calculating eligibility for job seekers' allowance has been reduced from five to three years. Claimants must have at least 360 qualifying days within this period.
2) In the eligibility criteria for unemployment assistance the term "employment" is being replaced by the more general "qualifying period".
3) Any unpaid leave over 30 days for the volunteer military reserve force is taken into account when establishing eligibility for job seekers' allowance. The payment of the allowance is suspended for the duration of the volunteer military service.
4) Job seekers' allowance can be paid from the day when the claim was submitted even if the employee terminated the employment or was dismissed for misconduct. Previously, payment in these cases could only start after 90 days.
5) If the job seeker is looking for work abroad, the payment of the assistance does not need to be terminated. The reason is that this is not possible under current regulations: job seekers are required to inform the employment service that they will be looking for work abroad at least 21 days in advance. Therefore eligibility will be exhausted within less than three months of their stay. This time is not sufficient to get to the first meeting set out in the cooperation agreement.
6) Temporary assistance for migrant workers can be paid for up to 60 days instead of 180 days.
7) To be eligible for pre-retirement job seekers' allowance job seekers must have received job seekers' allowance for 45 days rather than 90 days.
8) If a job seeker is not receiving any pre-retirement assistance (previously early pension), perpetuity for retired ballet dancers or benefits for ex-miners, they are entitled to pre-retirement job seekers' allowance. The National Employment Service notifies the pension authority regarding this. In the future these payments will no longer be called "assistance" but provision.
9) If the remaining amount of the job seekers' allowance is paid as a lump-sum for job seekers who obtain employment while claiming the allowance, the rules that were in force when the allowance was awarded must be applied.

Main legislation

Paragraph 1 Article 44, Paragraph 1 Article 52, points e), f), h), i), j) Article 53, points g), h) Article 54, Article 48 of Act CXCI of 2011 on assistance for people with partial work capacity and the amendment of certain acts, Articles 25–26 of Act CLXVII of 2011 on the abrogation of early pensions and on pre-retirement provisions and professional allowance.

On-line resources: munka.hu

9. Early retirement

Early retirement with state pension is no longer possible in Hungary from 1 January, 2012. Early retirement pensions were replaced by non-pension benefits – for more details see Section 13 on old age pensions.

Mixed interventions (complex programmes)

This policy combines a range of interventions for participants. These programmes are typically funded from European Union sources and are implemented under Priority 1 of the Social Renewal Operational Programme (SROP) that includes projects 1.1.1, 1.1.2 and project 1.1.4. These are briefly summarised by *Busch–Cseres-Gergely* (2012) and detailed descriptions can be found in the Operational Programme's Action Plan. Legal changes only affected the financing of projects and they are discussed in detail in the section on the financing of employment policy at the end of this chapter.

Main legislation

Government decision 1013/2011 (19 February) on the approval of SROP Action Plan for 2011–2013; Government decision 1094/2011 (13 April) amending certain development-related government decisions; Government decision 1230/2011 (5 July) on involving the National Tax and Customs Administration (NTCA) as a beneficiary in the implementation of SROP priority project 1.2.1 and amending SROP action plans for 2007–2008 and 2009–2010; Government decision 1276/2011 (10 August) amending SROP Action Plan for 2011–2013 and SROP Action Plan for 2011–2013; Government decision 1453/2011 (22 December) amending SROP Action Plan for 2011–2013 and Social Infrastructure Operational Programme Action Plan for 2011–2013; Government decision 1235/2012 (12 July) on Priority 1 and 2 for SROP Action Plan 2011–2013; Government decision 1282/2012. (6 August) on the reallocation of resources within priorities 3 and 5 of SROP Action Plan for 2011–2013.

On-line resources: munka.hu

LABOUR MARKET RELATED POLICY MEASURES

10. Labour taxation

De facto two-tiered personal income taxation

There were various changes in the regulation of personal income tax that could potentially affect the labour market. The most important change was that the single-rate personal income tax effectively became a dual-rate system. The tax rate is 16% if the gross annual income is under 2,424,000 forints. If the gross annual income is more than this, then the same 16% rate applies but the taxable base is 127% of the gross annual income. Thus, there are *de facto* two personal income tax rates: 16% and 20.3%. The latter corresponds to the universal income tax rate in 2011 so overall the tax rate for people earning less than 2.424 million forints per year decreased. However, given that tax credits were abol-

ished the tax burden on people on lowest income increased, while it reduced progressively for those nearer the upper end of the tax band.

Tax relief for those who are letting and renting properties at the same time

Those who are both letting and renting properties can deduct the rent they pay from their rental income. This might promote geographical mobility by reducing the tax burden on people who manage to let their difficult-to-sell properties. It is difficult to predict the effect of the decision that exempted housing subsidies from taxation in 2012: if the subsidies will be directed mainly to house buyers then it will reduce mobility, however if they support renting, it might have a positive effect on mobility.

There were other changes in personal income taxation that were indirectly related to the labour market such as the introduction of Széchenyi leisure card and Erzsébet voucher schemes.

Increase in simplified business tax

There were changes in the rules of simplified business tax. The tax rate rose from 30% to 37% and now businesses with a maximum revenue of 30 million forints per year – previously 25 million forints – can opt into this scheme. After these changes the simplified business tax is even more beneficial to slightly larger micro-enterprises with a low cost-ratio.

Centralised funding for vocational education and training

There were various changes in the payment of vocational training contribution, particularly the different ways to fulfil this obligation. All those who are subject to this tax can pay directly – the rate is 1.5% of the taxable income base. Since 1 January, 2012 only companies organising practical training for their employees can reduce their contributions by 440,000 forints/person/year. It is no longer possible for companies to deduct the amount spent on training of their employees from the contribution. At the same time more grant funding was made available to micro, small- and medium-sized enterprises for vocational education and training as well as adult learning in the framework of SROP Project 2.1.3.

VAT increased from 25 to 27%

The top rate of the value added tax increased from 25% to 27% on 1 January, 2012. On the one hand, this might reduce demand for goods and also labour demand. On the other hand it shifts tax burden away from labour to consumption that, on the contrary, might increase demand for labour.

Employer's contributions replaced by a tax

Contributions increased somewhat on 1 January, 2012: the single pension contribution rose from 9.5% to 10%, the health services contribution increased from 3% to 4% (see *Table 2*). Employers' contributions became a social contribution tax – the rates remained the same. The significance of this change is that whereas contributions confer an entitlement to receive a social benefit or service, taxes are unrequited payments. Tax revenues are general revenues and go to the central government budget, while revenues from contributions go to earmarked funds.

Health services insurance contribution must be paid by people who are ordinarily resident in Hungary and do not have a valid health insurance or are not entitled to free health care services; the self-employed and members of

businesses who are getting a pension. This was 6,390 forints/month or 213 forints/day in 2012.

Table 2: Contributions paid by employers and employees, social taxation

		Percent
Social security tax and contribution paid by the employer		
Social security contribution tax		27.0
Early retirement insurance contribution*		13.0
Paid by the employee		
Pension contribution**		10.0
Health care and labour market contributions	health services insurance contribution	4.0
	health-related benefits insurance contribution	3.0
	labour market contribution	1.5

* Twenty-five per cent of the early retirement contribution is paid by the central budget therefore the effective rate for employers and the self-employed is 9.75%. Only certain occupations are subject to this contribution.
** For both members of private pension funds and others. The upper rate of the contribution is 21,700 forints per day.

Separate act on supporting families

Income tax rules already favoured higher earners with multiple children in 2011; however this has been embedded in legislation since 1 January, 2012. The definition of family is set out in the law and it is also stipulated that the public should share the burden of bringing up children via two main instruments: tax reliefs for families and reduced rate contributions for parents returning to work after parental leave.

Main legislation

Act CLV of 2011 on vocational training contribution and the development of training, amended by Act LXIX of 2012 on taxation. Rules on personal income tax, payment of taxes and contributions and simplified business tax were amended by Act CLVI of 2011 on the amendment of taxation-related laws. Act LXIX on 2012 on taxation provides for the tax exemption of housing subsidies. The cardinal laws that stipulate the principle of burden sharing for families with children are: Act CCXI of 2011 on the protection of families and Act CXCIV of 2011 on Hungary's economic stability. Government decision 1067/2012 (20 March) on social cooperatives sets out provisions for reduced rate contributions for the employees of social cooperatives.

On-line resource: nav.gov.hu

11. Other transfers

Parental leave arrangements

Policy statement and nursery fees

In addition to taxation, family benefits are also set out in the act on families. The law stipulates that the state must contribute to the costs associated with pregnancy and caring for children aged less than three years, and to the cost of educating children.

The most significant change was that nurseries are allowed to collect fees from 15 January, 2012. This fee is intended to cover the difference between the income from normative state subsidy and the actual operating cost of the nursery; however it is capped at the per capita income for each family.[3] Families must declare their income and local councils can award exemptions. Families with three children or more are exempted from nursery fees by law.

3 The actual fee is based on the operating cost of the organisation. There is no statistical data on newly introduced fees, newspaper reports suggest between 100–220 forints per day, less commonly 500 forints.

There were no government-funded capital investment programmes to create new infrastructure for nurseries, however SROP Project 2.4.5 provided funding for the development of day care for children below three years of age, and regional operational programmes also supported the development of nurseries.

Main legislation

Nursery fees are regulated by Government decree 328/2011 (29 December) on fees for child welfare and child protection services and the assessment of eligibility.

12. Contractual terms of employment and changes in the Labour Code[*]

[*] Written by: *László Neumann*

Categories of organisational flexibility

The literature on the sociology of organisations distinguishes two main dimensions of labour flexibility (*Atkinson and Meager,* 1986):

1) *Numerical flexibility:* that can be internal or external, or differently, from the perspective of labour market transitions, flexible hiring and firing, or flexible working time patterns,
2) *Functional or organisational flexibility:* qualitative changes to the use of labour (for example job rotation for workers with multiple skills, training of workers, improved work processes etc.).

In addition to balancing *flexibility and security* (*flexicurity*), that is a key element of the European Union's employment strategies, financial or wage flexibility is also considered as an important factor in the wage adjustment of companies from the perspective of labour economics. Furthermore it is worth considering whether flexibility arrangements respond to the needs of the employer (as in the above examples) or the needs of workers as well (for example family-friend working time arrangements, workforce development, work-life balance etc.).

What is their impact on employment?

From a labour market perspective the two main factors of employment legislation are protection from dismissal and strengthening the position of workers in wage bargaining. These two are not unrelated either, and generally the law might cover both individual and collective employment rights (and thus have an impact on the opportunities of workers' organisations). Strict employment legislation might encourage some employers – those who are negatively affected by stricter rules – to take up undeclared employment that is outside the scope of labour legislation. At the same time as the increased likelihood of illegal or semi-legal employment, weaker sanctions for informal or illegal employment

practices are themselves sources of flexibility that must be considered in addition to the analysis of legislation (*Tonin*, 2009).

Labour market flexibility was not endangered by the protection of workers in Hungary

Hungarian labour laws were considered as one of the most flexible by European standards or even compared to other countries in Eastern Europe already in the mid-2000s (*Köllő and Nacsa,* 2005). This is also confirmed by comparative analyses of *employee protection* indicators that mainly focus on protection against dismissal of workers (including associated costs and procedural aspects) (*OECD,* 2009, *Venn,* 2009).[4]

Situation in August, 2011

Although the Labour Code that was in force until mid-2012 had been adopted in 1992, regular amendments by successive governments ensured that it responded to changing political and economic needs. The range of issues that could be regulated by collective or individual agreement according to the needs of employers was increasing after 1995, weakening the strong legal protection of workers. Minor changes in legislation during the economic crisis also increased flexibility (for example the ratification of reduced working time, extending the reference period for working time accounts – the period over which the number of hours worked can be averaged to calculate the total working time – changing the rules on "orderly labour relations", etc.). These changes aimed to protect jobs during the economic downturn as well as facilitate participation in public procurement for companies. However, these amendments originally intended as transitional measures were made a permanent part of labour legislation by the new Government after 2010.

4 Hungary's ranking on these indicators does not suggest at all that the level of protection would jeopardise labour market flexibility. According to the OECD's Employment Protection Index in 2008 there were only 10 countries that had higher overall labour market flexibility than Hungary. Hungary's score of 1.82 is smaller (indicating more flexibility) than the OECD average of 2.11 and Poland's 2.01, Slovakia's 2.45 or the Czech Republic's 3.0. For detailed flexibility rankings of Central-Eastern European countries by different indicators see *Tonin* (2009).

The amendment of the old Labour Code entered into force on 1 August, 2011

Before the reform of labour law in 2012 – in a way predicting its future direction – the amendment of the old Labour Code entered into force on 1 August, 2011. This allowed the extension of the probationary period to up to six months if approved by a collective agreement. There were also changes in the regulation of annual leave. If a worker could not fully use their annual leave allowance in a given year due to individual circumstances (such as illness) that lasted for six months or longer, then the remaining days could be carried over to the following year and used within six months – rather than 30 days as in the previous system. Also in the previous system, annual leave could be taken in more than two instalments only if this was requested by the worker. After 1 August, employers can also make this decision if it is justified by their business interest; although workers are still entitled to at least a continuous period of 14 days of annual leave each year. The most contested element of the amendment was whether overtime must be paid or can be compensated by time off. In the previous system the latter was only allowed if both parties agreed or it was set out in relevant regulations (collective agreement), but from 1 August – until the new Labour Code came into force – employers had the possibility to make a unilateral decision regarding this. Nevertheless the length of time-off provided must be at least of equal duration to the overtime work.

Transposition of the EU directive on temporary agency work

On 1 December 2011 the amendments transposing the European Union Directive 2008/104/EC on temporary agency work came into effect. The two main changes of the Directive concern the temporary nature of agency work and the equal treatment of temporary agency workers. These issues were highly controversial and debated for a long time in the EU and the provisions of the Directive will have a significant impact on the operation of temporary-work agencies in Hungary. As regards the temporary nature of agency work, the Hungarian legislator took maximum advantage of the provisions and set the maximum duration of temporary agency work undertaken by the same user at five years including any renewal or new assignment within six months from the end of the previous assignment, regardless of the temporary-work agency. Temporary agency workers are entitled to the same basic working and employment conditions, including pay and other benefits that would apply had they been recruited directly by the company to occupy the same job. The only exemption from this during the first 184 days of employment is when the temporary agency worker has a permanent contract of employment with a temporary-work agency and continues to be paid between assignments, or is considered absent from the labour market for an extended period of time, or is assigned to work for a company with majority ownership by the local council or a non-profit public benefit organisation. (The latter essentially covers temporary agency work within public works employment that was re-regulated by a government decree in September 2011.)

Situation between September 2011 and September 2012

The main objective of the new Labour Code: increasing the flexibility of employment

The main development of this period was, undoubtedly, the adoption of the new Labour Code in December 2011. Major work on the re-conceptualisation of labour legislation was commissioned by previous governments before the crisis; however, for political reasons this has never reached legislative stage. It was argued that the need for a new Code was justified by changes in the structure of the economy since 1992 (the dominance of private ownership, the share of small- and medium sized enterprises, the spread of atypical forms of employment, increased demand for flexibility) and the failure to meet the original legal and policy objectives from 1992 (expanding the playing field of collective agreements). The new law was also justified by tasks arising from the harmonisation of EU law, and its Preamble even refers to the European Commission's Green Paper on Modernising Labour Law in the 21st century based on the EU's Lisbon Strategy (*EC,* 2006) as well as academic debates and legal solutions in Member States. These highlighted legal measures necessary to create flexible employment conditions while maintaining the social security of workers.

The main direction of the Labour Code that entered into force in 2012 – similarly to the amendments of the old Labour Code – is aimed at increasing the flexibility of employment; however it also creates a new conceptual framework for this. Although the Government published the proposal in June, consulta-

tions with trade unions were protracted.[5] The act – that was also amended by the act on transitional provisions adopted in June 2012 – entered into force on 1 July, 2012, however certain provisions only apply from 1 January, 2013.

5 The social dialogue process will be discussed later (for more details see *Tóth,* 2012).

Re-conceptualisation of labour law: private law approach instead of public law

In terms of legal theory, the main innovation of the new law is that it shifts the approach of the regulation from public to private law. This breaks the traditional protective function of labour law that aimed to balance out the asymmetric bargaining positions of the two sides of an employment relationship and at protecting workers in the weaker market position. Therefore the new Labour Code allows more scope for collective and individual agreements and by default these can even be unfavourable for employees. (In the old act this was the exception, only in exceptional cases could these agreements be unfavourable for employees.) On the other hand, where the act provides for minimum standards (for example the limit for compulsory overtime), these standards were lowered. Thus in terms of flexibility of employment, the only limitations are those provided by Hungary's international commitments (EU directives, ILO agreements). The possibility or prohibition of deviation from the provisions of the law by collective agreement or individual employment contract is highlighted in a separate article at the end of each chapter in the Labour Code.[6]

6 The possibility of deviation is also pointed out by trade union commentators (for example *Czuglerné,* 2012, *Schnider,* 2012).

The detailed overview and interpretation of the Labour Code is beyond the scope of this chapter, and there is also an abundance of literature – aimed at facilitating the application of the law – published since the new Code entered into force.[7] (This seems necessary, though the new law from a legal technical point is admittedly – even by its critics – better than the old one, it can hardly be considered user-friendly. A number of earlier provisions are not set out in detail and their applicability can only be inferred from other articles, the justification of legislation and related legislation – such as the general principles of conduct or the Civil Code.) Therefore this analysis concentrates on flexibility measures that are relevant from a labour market perspective and follows the typology of labour flexibility in the literature on the sociology of organisations presented earlier. The description highlights only the main elements of provisions, it does not aim to provide a detailed description of legal conditions, nor does it discuss the potential impact of the implementation of the new law.

7 Various textbooks (*Gyulavári,* 2012) and manuals (for example *Horváth,* 2012; *Pál et al.* 2012; *Bankó et al.* 2012) provide a detailed interpretation of the act. The latter can be purchased in an electronic format that is regularly updated (Complex labour law e-commentary). Furthermore, readers with a general interest in labour law might find useful information on some thematic websites such as the blogs of *Gábor Kártyás* and others, and publications targeted at specific groups – employers, employees (*Bodnár,* 2012; *Kártyás and Takács,* 2012).

The new act mainly facilitates quantitative changes in the workforce

With regards to the flexibility of individual employment, the new law makes it easier to change the quantity of labour (external and internal numerical flexibility). In terms of recruitment, the already mentioned extension of the probationary period is a measure – in principle available to both employers and employees – that allows the termination of employment without justification and consequences. The new Labour Code retained the earlier provision that the maximum length of the probationary period allowed by a collective agreement can be six months. The employment contract must give details of the length of the probationary period, and in the absence of a collective agreement this can be up to three months. If the probationary period is shorter than this, it can

be extended – once – by mutual agreement, however the total length of the extended probationary period should not exceed three months.

Separate chapter on atypical employment

Employment contracts can pertain to full- or part-time, as well as fixed-term or permanent employment. The new Labour Code does not state how many times a fixed-term employment contract can be extended, however its length in total should not exceed five years. A new, family-friendly provision allows employees to reduce working hours by half until their children reach the age of three. A new feature of the law is the incorporation of atypical forms of employment (part-time on-call work, job-sharing, working for multiple employers, tele-work, home-based work, simplified employment or casual work). The law regulates a broader range of these by allowing the parties to agree on a number of issues. Temporary agency work remains to be a special type of employment where only the nature of the work or job and basic pay must be agreed in advance, information about the location of work and other working conditions can be provided later.

From the perspective of labour market flexibility the revised regulation of the termination of employment by the employer is of key importance. It is not accidental that during the preparation of the new law this was the area that came under attack the most and legislators were forced to change their proposals in a number of areas, such as the prohibition and protection from dismissal or termination of employment without justification. Groups that were under prohibition or protection from dismissal remained in the new law as a result of compromises however detailed regulations changed significantly. (For example the rule that allows employers to dismiss members of these groups due to issues relating to the ability of the employee or the operation of the employer might offer loopholes.) At the same time the new law also allows employers to dismiss workers during different forms of unpaid leave (illness, parental leave, caring for relatives etc.). In these cases the notice period starts after the employer has returned to work. The statutory notice period is 30 days and it increases according to the length of service. However, a new provision is that if the employee initiates the termination of employment, the notice period does not increase, it remains 30 days. Although the basic rules of collective dismissal did not change, the rights of trade unions in relation to it did change: employers are not required to consult the trade union even in the absence of a works council. For temporary agency workers the notice period was changed to 15 days as opposed to the previous regulation that provided for 30 days if the duration of employment reached one year.

Less costly and easier to dismiss workers

In addition to the limitations and procedural rules of dismissal, its costs to employers are also relevant. Apart from costs associated with the notice period, the most important cost is redundancy pay. Statutory redundancy pay decreased somewhat. The law still stipulates that redundancy pay is three to six months' pay, but the length of service is calculated as the period up to the first

day of the notice period rather than the last day. Furthermore, while redundancy pay was based on average pay previously, in the current system it is based on the absence pay that is often lower because it excludes non-salary payments (premiums or bonuses). According to the new law employees are not entitled to redundancy pay if they have been dismissed on the basis of discipline or their skills and which are unrelated to their health status. The additional redundancy pay for older workers was reduced from three months' pay to between one and three months based on the length of employment. As a general rule the length of the notice period and the amount of redundancy pay can be increased by collective agreement, however this is prohibited in publicly owned companies.

Risks associated with unlawful dismissal: compensation instead of continued employment – lower than previously

A special aspect of the costs associated with dismissal, although a highly relevant one from the perspective of everyday practice, is the legal consequences of unfair dismissal. According to the old law if the court established that the dismissal was unfair the employee could be reinstated in their original job. This has no longer been a general requirement in the new law since July and it is only possible under specific circumstances. The legislators argued that this was justified by the general experience that most employees did not want to return to their job and asked for compensation instead. Employers who were found guilty of unfair dismissal had to pay compensation and salary to employees up to the entry into force of the court ruling. In practice, due to delays in court procedures, this could amount to years of pay. The new Labour Code drastically reduced the amount of pay for unfair dismissal to up to 12 months' absence pay.

Reference period to facilitate more flexible working time management

The new regulation of working time and time off helps the flexible adaptation of employers. On the one hand, the new law extended the possibilities for employers to adjust working time in response to changes in demand. Therefore the new regulation extended the upper limit of compulsory overtime to 250 hours from 200 hours. A collective agreement – similarly to the previous regulation – may allow even more: up to 300 hours. The work schedule must still be notified at least a week in advance and given to the employee in writing. However, the new law allows employers to change the schedule up to four days prior to a given day if there are unforeseen circumstances in their operation. The regulation of the reference period did not change, however irregular working time patterns can be introduced using "working time banks", a new tool that allow employees – similarly to a reference period of four to 12 months – to average their weekly working hours over a longer period of time. Such reference periods of "working time banks", however, can be started flexibly, even in consecutive weeks. This creates a flexible working time bank that allows employers to manage working hours on a "quasi-rolling" basis. The new Labour Code introduced the concept of "unbound" working time that allows employees to set their own working pattern. This must be authorised by the employer in writing and justified by the nature or requirements of the job.

"Unbound" working time is when an employee is managing on average at least half of their own weekly working time. Employees working in a flexible pattern are not required to fill in time sheets.

The additional annual leave for parents with children was retained in the new Labour Code and both fathers and mothers are entitled to this. Fathers are also entitled to five days of paid paternity leave that must be used within two months of the birth of their child.

Lower wage supplements – flexibility at a lower cost

In addition to the extent of flexibility, its cost is also an important regulatory consideration. Therefore the law changed the regulation of pay rates related to different working patterns. Flexible working might be disadvantageous to some workers because they are not entitled to compensation or pay for overtime. More importantly, new regulations were introduced for night and shift work pay rates. According to the new Labour Code additional rates must be paid by employers that operate on a multiple shift basis which means that they operate for at least 80 hours per week. This means that they must employ at least two shifts of full-time (40 hours per week) workforce. Overlapping shifts – when two eight-hour-long shifts are overlapping – are not considered multiple shifts. In multiple-shift operations workers are entitled to a wage supplement of 30% for work between 6pm and 6am, if they work regularly in variable shifts. Those who do not work shifts are entitled to a 15% wage supplement for any night work if its duration is more than one hour. The wage supplement for afternoon shifts was abolished. For work on Sunday during regular business hours (for example in the retail sector) workers are entitled to a wage supplement of 50% rather than 100%. Organisations that operate on a continuous basis are not required to pay a wage supplement for work on Sunday. The wage supplement for working on public holidays was reduced from 200% to 100%.

The wage supplement for overtime (irregular working time) is 50% and – as a step back from a previous amendment – it can only be compensated by time off based on individual agreement or specific provisions. The wage supplement rate for on-call working is 20%, and for standby work it is 40%. The new Labour Code allows parties to agree a flat-rate pay that includes the basic wage and supplements for shift work, on-call or standby work. This does not need to be set out by a collective agreement; it can be based on an individual agreement between the employer and the employee. This not only reduces the administrative burden but also might reduce wage costs. An extreme example would be people who are paid the statutory minimum wage working night shifts or Sundays. According to the provisions of transitional legislation, under the same working conditions the flat-rate pay must not be lower than the monthly average pay of the employer in the previous year. Nevertheless – in the long run and in the case of new entrants – this creates a strong bargaining opportunity for employers to reduce wage costs.

Some other provisions of the new law also offer – limited – opportunities for wage adjustment and even a reduction in pay. On the one hand for time away from work employees must be paid an absence pay rather than the average pay. The absence pay might be lower than the average pay because it does not include certain elements of pay. On the other hand the new law allows employers to withdraw their unilateral written or verbal promise of a wage increase (if it had not been included in a contract) if important changes in their operation would make this very difficult to fulfil or would put an unreasonable burden on the employer.

Indemnity: reduced financial responsibility for employers

The legislator also aimed to reduce the financial risk of employers: employees who either "take payments or valuables from third parties or pay them money or hand over valuables as part of their job" must pay a deposit. This cannot be more than one month's basic pay. The increased liability of workers for damages arising out of negligence is also intended to minimise employers' risks. According to the law that was in force on 30 June, 2012 this could be up to 50% of the average monthly pay. In the new legislation – as the main rule – this can be up to four months' absence pay but a collective agreement can provide for a diversion in both directions and it can be increased to up to eight months' absence pay. The same liability provisions apply for inventory shortages. On the other hand the new law reduces employers' liability towards employees, for example they are exempt from liability if they provide evidence that the damage was caused by circumstances outside their control and it would have been unreasonable to expect them to avoid or avert the circumstances in which the damage has arisen.

Simpler rules for work outside the scope of employment contracts

The Labour Code has always had provisions for certain forms of functional flexibility; nevertheless the new law simplifies work outside the scope of the employment contract such as the re-assignment, posting and transfer of workers. The new law uses the concept of employment outside the scope of the work contract for work in a different job, location or for a different employer. Under certain conditions an employer can order workers to perform work outside the scope of their employment contract; however its annual maximum duration was reduced by the new law. While in the previous system this could reach 110 days per year, or even longer under a collective agreement, the new Labour Code allows a total of 44 working days or 352 hours, nevertheless a collective agreement or individual employment contract might provide differently.

To some extent the different types of employment contract mentioned previously also facilitate flexibility: job sharing, employment by multiple employers and part-time on-call work. The last one is particularly interesting because the legislator tried to transfer an existing practice of "zero-hour contract" from Western Europe to Hungary, thus the new law is not only responding to employers' demands but actively tries to promote the introduction of atypical forms of employment. Nevertheless forms of employment that are considered

innovative in the sociology of work literature, organisational learning and conditions for in-work training and professional development are somewhat neglected by the new law – this was no different in the old Labour Code. In-work training and professional development is only regulated in relation to study agreements and contrary to earlier practice, employers are not required to provide leave for workers participating in formal education – except those in primary and lower secondary education.[8]

An inherent characteristic of employment is the hierarchical relationship between employer and employee. A number of provisions of the new Labour Code reinforce this hierarchy. For example employees' conduct must reflect the trust of their employer to perform the duties of the job. According to the justification of legislation this is "the new quality measure of work", a general – therefore extending beyond the scope of work – principle of conduct that naturally follows from the nature of employment based on trust. Alongside this, the legal consequences for a breach of the employment contract were revised in the act. As a general rule, sanctions can be set out by a collective agreement, however if there is no collective agreement, they can be stipulated in the employment contract. At the same time the legislator aimed to counterbalance the weaker bargaining position of individual employees by prescribing a new requirement of conduct for employers: they must take into "reasonable consideration" the interest of the employee and should not cause "disproportionate harm".

Employers must take employees' interests into "reasonable consideration"

The Labour Code – similarly to the old one – allows for sectoral regulations in separate acts. These are most likely in transport and health care, however a new provision is that they are not limited to the regulation of working time and time off but also have provisions for industrial action, i.e. the level of essential services and the emergency measures that the government can introduce. For example in public transport 66% of services on local and commuter routes and 50% on national and regional routes must be operated during industrial action. The provisions on health care emergency situations were incorporated into the act on water supply and adopted in December 2011.

Sectoral rules on essential services during industrial action

The act on civil servants tries to introduce some flexibility into public sector employment. A number of measures facilitate flexible employment: the amendment of appointments, temporary employment outside the scope of appointment, temporary transfer, assignment, posting, assignment due to government interest, permanent transfer etc. are all regulated by the act. The implementing decree sets out detailed rules for the working time and time-off of civil servants, tele-working, and public holidays. (The scope of the act covers civil servants at both the local and central levels of public administration, the armed forces and civil servants employed by other authorities. It should be noted that separate acts and implementing decrees regulate the employment of judges, prosecutors, professional and contract soldiers but these are not presented here.) There is a separate implementing decree on the qualification requirements for

More flexible employment also in the public sector

8 According to various surveys employers in Hungary provide less training to their employees in comparison to other European countries (*Eurofound*, 2012). Apart from the legislative framework, workplace training is also influenced by financing conditions. In this respect, the fact that vocational training contribution can no longer be used to finance local workplace training is clearly a negative development because the Government is using this to centralise the management of vocational education and training.

civil servants and detailed disciplinary rules and procedures. The act stipulates the general rules of employment in civil service, including principles of conduct, working time, pay, promotion and conflict of interest and termination of employment. Among the general principles of conduct, the act states that civil servants must refrain from any actions, even outside their working hours, that might lead to a loss of confidence. The act also stipulates that the employment of a civil servant must be terminated if their performance is not adequate or they have lost the confidence of their superior. According to the act, the loss of confidence can be related to the actions or work performance of the civil servant, it should be factual and evidence should be provided. The employer must state the reasons for the termination of employment and in legal disputes the employer has the burden of proof to show that these have been real and objective.

There were no new general regulations for public service employees (such as workers in public education, health care and social services), who make up the majority of the workforce in the public sector. The only – and far from insignificant – exception within public service was health care where new sectoral legislation was introduced with a range of sector-specific flexibility provisions: on-call working, voluntary overtime etc. After 1 March, 2012 employers can unilaterally impose up to 16 hours per week on-call work, however working longer than 12 hours per day in the health care sector must always be considered "voluntary overtime", though it is paid. On the other hand the act gives an exemption from the application of wage supplement regulations of the new Labour Code in this sector. Otherwise – according to estimates of a trade union in the sector – employees in the health sector would see their pre-tax pay cut on average by 8,000–12,000 forints per month.

Main legislation

Act CV of 2011 on the amendment of certain labour related and other legislation for the purpose of legal harmonisation; Act I of 2012 on the Labour Code; Act LXXXVI of 2012 on transitional measures and legal amendments in relation to the entry into force of Act I of 2012 on the Labour Code; Government Decree 135/2012 (28 June) amending certain government decrees in relation to the entry into force of the new Labour Code; MfNE decree 17/2012 (5 July) amending certain ministerial decrees in relation to the entry into force of the new Labour Code; Government decree 136/2012 (28 June) amending Government Decree 375/2010 (31 December) on state subsidies for public works employment and Government Decree 171/2011 (24 August) amending certain government decrees in relation to public works employment; Act CXL of 2011 amending Act XXXIII of 1992 on the legal status of public servants; Ministry of Interior decree 37/2011 (28 October) implementing provisions of the Act XXXIII of 1992 in certain agencies and public bodies under the supervision of the Minister of the Interior; Government decree 373/2011 (31

December) appointing agencies to perform occupational health and safety tasks; Government decree 273/2011 (20 December) on the rates of occupational health and safety fines and procedures for imposing fines; MfNE decree 1/2012 (26 January) on orderly labour relations and ways to demonstrate this; Act CXCIX of 2011 on civil servants; Government decree 29/2012 (7 March) on qualification requirements for civil servants; Government decree 30/2012 (7 March) on working time and time off for civil servants, administration holidays, responsibilities of civil servants and employers and on tele-working; Government decree 31/2012 (7 March) on disciplinary procedures against civil servants; Government decree 45/2012 (20 March) on provisions relating to personal documents of civil servants, personal documents and labour registration of other employees in public administration, civil service register, collection of statistical data on civil service, and reserve of civil servants; Act V of 2012 and transitional legislation and legislation being amended or repealed in relation to the act on civil servants; Act CLXXVI of 2011 amending certain health care related legislation; Act LXXIX of 2012 amending certain health care related legislation; Act CLXII of 2011 on the legal status and remuneration of judges; Act CLXIV of 2011 on the legal status of the chief prosecutor, prosecutors and other employees of the prosecution service, and career path in the prosecution service; Act CXCII of 2011 amending Act XCV of 2001 and other acts on the legal status of professional and contract soldiers in the Hungarian Army; Act CLXXXIV of 2011 amending Act XLIII of 1996 on professional members of the armed forces in relation to the coordination of civil service career paths and amending certain labour-related legislation; Act CCIX of 2011 on water utilities.

13. Old age and disability pensions – disability supports

Abolition of early retirement

Retirement before the statutory pension age was abolished in Hungary after 1 January, 2012. The relevant act, given its complexity, will not be presented here in detail, only the most important provisions will be highlighted. It addressed three main areas: early retirement, retirement before statutory pension age, and other pensions such as artists' pensions. Retirement before the statutory pension age was available for workers in hazardous occupations or members of the armed forces, while early retirement was available for anyone who had enough qualifying years. Existing early pensions were re-classified as pre-retirement benefits – in the armed forces for example early pensions that were awarded on the basis of disability were transformed into a service allowance. These are paid to those who have already been awarded a pension.

The rights of people in early retirement changed in a number of ways: in terms of their legal status, they are no longer pensioners and therefore they are not entitled to benefits and tax reliefs available for pensioners, most importantly reduced-rate contributions for those who are working. Similarly to people in

early retirement in the previous system, they must not work while they are receiving benefits. However, unlike old age pensioners, they can claim job seekers' assistance but in this case their benefit is suspended. The regulation provides for strict penalties for those who work illegally while claiming benefits: they must pay back one year's (or the total amount, whichever is higher) benefit paid to them. The benefit will be stopped and cannot be claimed again.

The Government appointed the Minister for National Economy to work out the details of the new system of pre-retirement benefits for hazardous and special occupations; however this did not happen before the final draft of this manuscript was completed.

Pensions and other pension-like benefits increased by 0.5% on 1 January 2012.

Main legislation

Act CLXVII of 2011 repealing early old age pensions and setting out provisions for pre-retirement benefits and service allowance; Government decision 1356/2011 (21 October) on elaborating the conditions of provisions replacing early retirement; Government decree 333/2011 (29 December) on provisions before the pension age, procedural regulations for service allowance, perpetuity for retired ballet dancers and benefits for ex-miners, and amending related government decree, Government decree 335/2011. (29 December) on the increase of pension and certain other benefits as of January 2012; Government decree 354/2011 (30 December) on entitlement to social security provisions and private pensions and the amendment of Government decree 195/1997 (5 November) on the implementation of Act LXXX of 1997; Government decree 60/2012 amending certain government decrees related to pension insurance and social provisions (repealing early pensions). The principles of old age pensions are set out in Chapter 6 of (cardinal) Act CXCIV of 2011 on Hungary's economic stability.

On-line resources: onyf.hu

Disability pensions – disability supports

Alongside the transformation of old age pensions, the system of disability pensions also underwent changes. Disability pensions were replaced by benefits for people with partial work capacity. To qualify for these benefits the health status of the claimant must be 60% or under and they:

– have had social insurance for at least 1,095 days during the five years prior to application,
– are not in employment;
– are not receiving regular financial assistance.

The benefit can take the form of rehabilitation assistance if the claimant has been found suitable for vocational rehabilitation (see Section 5 on this) or disability assistance if they are not recommended for vocational rehabilitation. Claimants must be awarded disability assistance even if they are suitable for

vocational rehabilitation but they are no more than five years from the old age pension age.

Main legislation

Act CXCI of 2011 on assistance for people with partial work capacity and the amendment of certain acts; Government decree 327/2011 (29 December) on procedural rules for assistance to people with partial work capacity.

14. Wage bargaining, wage regulation and interest representation[*]

[*] Written by: *László Neumann*

What is their impact on employment?

Structural characteristics of wage bargaining

The impact of wage development on macroeconomic processes – including employment – heavily depends on the characteristics of wage bargaining: 1) the level of collective wage agreement (national, sectoral, or company), 2) to what extent collective agreements limit individual wage bargaining (for example with pay scale agreements), 3) whether it is possible to deviate from higher-level agreements at the local level, 4) the number and characteristics of workers covered by collective agreements, and last but not least, 5) where individual market-based agreement is possible independently from higher-level agreements. The effect of regulation also depends on whether it facilitates or hinders the adjustment of wages in relation to the equilibrium – influenced by other factors –, the sectoral structure of the economy or its integration into the world economy. Therefore there is no single optimum model (*Calmfors,* 1993).

A special institution of wage regulation is statutory or contractual minimum wage that sets the minimum level of pay – even for different groups of workers. Generally this has a negative effect on employment, but if the employer has a significant market power it can be neutral (*Manning,* 2003). Another common type of government intervention is the extension of an autonomous sectoral collective agreement to all employers of the sector.

Situation in August 2011

Hungary has a dual system of wage negotiation. Pay for public servants and public sector employees – depending on education attainment and years of service – is set out in tariff tables in the relevant acts and it is part of the state budget. On the contrary, in the business sector wages are set freely – apart from the minimum wage already mentioned above – in a decentralised negotiation. Trade unions have a low membership in Hungary, and instead of sectoral wage negotiations found in several Western European countries, wages are typically influenced by company collective agreements (although there are some sectoral wage agreements too). However, their impact on wages is not significant (*Neumann* 2001), and they are more common in companies that operate in highly concentrated markets or are publicly owned (*Kertesi and Köllő,* 2003). (This topic, among others, is discussed in more detail by *Mariann Rigó* in the section *In Focus – II* of this volume.)

The lowest level of pay is set by the minimum wage that has been different for skilled and unskilled workers since 2006. From 2011 there have been two additional lower rates for public works employment. Until 1 January, 2011 the minimum wage was set through tripartite (employee, employer and government) negotiations in the National Council for the Reconciliation of Interests (in Hungarian: Országos Érdekegyeztető Tanács, OÉT). The Council also issued tripartite recommendations for pay increases each year, however after the Council was abolished these ceased to exist too.[9]

Situation between August 2011 and August 2012

Twenty-twelve was the first year when national wage negotiations were entirely conducted in the new negotiation structure, in which the Government, following consultations with social partners, decides independently about the minimum wage and the minimum wage for skilled workers. Although the new Labour Code allows the Government to set different levels of minimum wage for certain groups of workers depending on the characteristics of sectoral and regional labour markets, this did not happen in 2012. According to the Government decree the lowest basic pay for full-time employees must be no less than 93,000 forints per month. The two-tiered minimum wage was retained. The guaranteed minimum wage for full-time workers with at least secondary education or a secondary vocational qualification must be 108,000 forints per month. (The Government Decree also sets out the weekly, daily and hourly minimum wage.) The significant rise of pre-tax minimum wages (19.2% and 14.9%) aimed to offset the effect of changes in labour taxation, nevertheless the net value of the minimum wage for skilled workers still declined slightly. (As has been mentioned previously, tax credits were abolished on 1 January, 2012 and the contributions paid by employees went up by one percentage point.)

Four categories of minimum wage including public works employment

Pay in public works was also set by a government decree for 2012: for full-time unskilled work this was 71,800 forints, for skilled work 92,000 forints per month. Compared to the previous year the increase was considerable here too, and in 2012 the pre-tax public works pay for unskilled workers was 77.2% of the relevant minimum wage, and for skilled workers this was 85.2%. (These changes meant a net increase of 4.6% of the unskilled public works pay and a two per cent decrease of the skilled workers). Overall, although the advantage of skilled workers decreased slightly, there was still a wage-tariff type minimum wage system with four categories.

The Government set out the rate of "expected pay increase" for low-paid workers in 2012 too

Due to changes in labour taxation the nominal net pay of those earning less than 216,806 forints per month would decrease. To prevent this, in addition to the increase of the minimum wage – and following the previous year's indirect intervention – the Government also set the so-called expected rate of pay increase. The government decree provides a detailed list of the rates of necessary pay increase to maintain the net value of wages between 59,000 and 216,805 forints per month (in a table format, with 37 rows). The expected pay increase

9 According to data on wage increases above the rate recommended by the OÉT – wage drift – and wage increases falling short of the lower values from that period show that tripartite recommendations had a significant role in "orientating" lower level wage negotiations and wage setting, thus they were the starting point for the arguments of both trade unions and employers in collective bargaining (*Koltay,* 2000).

includes the increase of the minimum wage and guaranteed minimum pay and the increase of non-salary payment; however these can cover up to 25% of the expected pay rise. The decree also stipulates that some wage supplements must be taken into account, such as the wage supplement for shift work (but not the wage supplement for overtime). Employers that employ low-paid workers and implement a pay increase can claim a tax relief on the newly introduced social contribution tax; however to qualify for this all permanent employees must receive a pay increase. The tax relief was designed in such a way that the employers' burden would only increase by up to five per cent per employee.[10]

From 1 January, 2012 the labour inspectorate must also check whether a company has implemented the wage compensation requirement for at least two thirds of the workforce. If the labour inspection finds that the pay increase has not been implemented for employees earning less than 300,000 forints per month, the inspectorate will issue a decision. Although no fine will be imposed, the employer will be placed on the list of companies "without orderly labour relations" published on the inspectorate's website. The employer can still implement the expected pay increase. Therefore, even if in a slightly weaker form, the previous year's sanction that threatened employers with a ban from public procurement and public subsidies had they not implemented the wage compensation remained in effect. However in 2012 employers that implement the pay increase for at least two thirds of the workforce can qualify for public subsidies.

Subsidies for employers that implement wage compensation

In addition to the normative support and sanction, the Government also supported employers that implemented the wage compensation through a grants system. Funding was available for businesses that were unable to implement the wage increase despite the normative subsidy. The policy targeted businesses with a labour intensive operation and a predominantly low-paid workforce. According to the relevant government decree employers qualified for support to implement the wage compensation for workers earning less than 215,000 forints per month. The subsidy covered up to three percentage points of the expected pay increase and social contribution tax payable on this for 12 months and it was paid to the employer by the job centre in no more than two instalments. Other qualifying conditions included that the average yearly headcount must not be lower than that in 2011 and that the employer must not implement a reduction of the working time for more than 20% of the workforce in 2012. These conditions proved too strict in practice: the programme had a budget of 21 billion forints, however only 5.9 billion forints worth of subsidy was claimed. The employment service received 4,094 applications out of which 4,006 were funded. According to a communication from the Ministry for National Economy the 5.61 billion forints contributed to the pay increase of more than 124,000 employees – and helped more than 146,000 workers to retain their job.

10 The calculation of wage compensation is based on the same logic as that of the tax credit, which has just been phased out. Up to pre-tax earnings of 75,000 forints per month, the tax relief is 21.5% but no more than 16,125 forints. For wages over 75,000 forints, the 16,125 forints should be reduced by 14% of the difference between the actual earning and 75,000 forints. Thus, those earning more than 185,000 forints per month before tax are no longer entitled to the compensatory tax relief in 2012.

The scope of legislation on expected pay increase does not cover the public sector, organisations operated by churches or workers in simplified employment. Separate regulations set out the requirement of wage compensation for public sector and church employers – although to a lesser extent than in the private sector because in these cases it should also be taken into account whether an employee or their spouse qualifies for family tax credit. Thus, only simplified employment was left out of wage compensation – and of course the self-employed who were not entitled to tax credit either. Nonetheless, wage compensation affected millions of employees (based on preliminary data from the National Tax and Custom Authority businesses claimed tax relief for approximately 980,000 employees, approximately half of those potentially eligible by January),[11] and its budgetary impact can only be estimated. More reliable data was made available by the Hungarian National Asset Management Inc. (Magyar Nemzeti Vagyonkezelő Zrt.) on companies with majority public ownership. In these companies wage compensation affected a total of 80,000 workers and cost 22 billion forints in 2012. According to tax regulations and the new Labour Code the system of wage compensation will continue into the coming years. As stipulated by the Labour Code "the Government has got the authorisation to issue a decree on the rate of pay increase required to preserve the net value of monthly wages under 300,000 forints".

11 Óriásit bukott a büdzsé a bérkompenzáción (Huge budget losses due to wage compensation) FN24, 24 March, 2012.

Public sector: despite a pay freeze nominal pay rises as a result of the minimum wage increases and wage compensation

The increase of the minimum wage and guaranteed wage minimum as well as the wage compensation had a significant impact on wage development in the public sector. In the public sector basic pay is regulated by the law and pay rates for each grade – which depend on qualification and years of service – are set out in statutory pay scales. Employers can deviate from pay scales to some extent (in the case of public servants for example, only upwards); however the majority of organisations in the public sector do not have the financial resources to pay a larger number of their staff higher wages. In the public sector a wage increase would predominantly mean the increase of tariff wages; however this has not happened since 2006 and in the meantime the 13th month pay was also taken away. The reason behind a slight nominal increase in public sector pay, despite these developments, has been that the minimum wage and the guaranteed wage minimum must be ensured in the public sector too. This pushed slightly upwards the bottom half of the salary bands. (To a lesser extent pay also increased because of automatic promotions between grades due to length of service or staff gaining new qualifications.) Among public sector employees, who make up the majority of the workforce in the public sector, 62 out of the 140 wage tariffs had to be substituted by the minimum wage or the guaranteed wage minimum. For example even in Grade E7 that is the grade for workers with a tertiary vocational qualification (but higher education) someone with less than 20 years of service would only receive the guaranteed wage minimum for skilled workers. Therefore it is not surprising

that both employers and trade unions have been complaining about the compressed pay scale.

The health care sector was an exception: pay increase as a result of junior doctors' action

Some sectors in the public sector have had their own pay scales for some time, for example higher education. A separate pay scale was introduced in the health care sector as a new measure in 2012. The reason behind this was the wage demand of junior doctors that was accompanied with high profile actions (for example junior doctors en masse deposited their resignation letter), and they successfully used the increasing migration of doctors from Eastern Europe to give weight to their demands. (There had been similar actions by doctors in the Czech Republic and Slovakia too.) The Government's reaction was twofold: on the one hand they incorporated provisions limiting the possibility of industrial action in the health care sector into a legislative proposal – on a completely different issue – that was being discussed at that time. On the other hand, they started negotiations with the representatives of junior doctors. (From the perspective of industrial relations, it was an interesting development that instead of the traditional trade unions in the health sector, the newly formed Hungarian Association of Junior Doctors (Magyar Rezidens Szövetség) – that was originally conceived as a professional body – represented the doctors in the negotiations.) As a result the Government published a decree in March 2012 on "the possible wage development of certain health care professionals in 2012" and then in June the "health care omnibus act" provided for "the retrospective and progressive wage increase for health care workers". This introduced a tiered increase for doctors depending on their basic pay. The rate of the increase was 65,800 forints per month for those earning less than 350,000 forints and then progressively reduced to 10,000 forints per month for those earning 450,000 forints or more. The law provided for a smaller scale pay increase for other health care professionals as well as those with a non-health related degree in the specialist care sector; in total approximately 86,000 employees saw their basic pay increase. Furthermore, the Government pledged to increase the self-employed family doctors' "card fee" – a flat rate fee family doctors receive for each patient who is registered with the surgery. However, the approximately ten thousand health care professionals in the primary care sector and – due to the sectoral scope of the law – those working in similar jobs but in social care will not receive a pay increase.

The number and coverage of company-level wage agreements is declining

Together with legislation and national agreements – at least in the business sector – sectoral and company-level collective wage agreements should have a prominent role in wage setting arrangements in principle. Although on paper both the old and new labour codes promote collective agreements in the business sector, in reality their role in wage setting is increasingly weak. As has been highlighted previously, sectoral wage agreements have always been uncommon and their coverage of companies and workers remained moderate. In the system of collective bargaining that developed in the nineties, company-level agree-

ments had a more dominant role, and yearly wage agreements were predominantly framework agreements on the rate of pay increase. Tariff agreements – similar to collective agreements in Western Europe and North America – were rare (*Tóth,* 2006). Although in the early- and mid-nineties, during times of high inflation, wage agreements had a significant role, in the past decade the role of company-level agreements that provide a large degree of autonomy and flexibility to the management of companies has been declining both in terms of numbers and coverage.[12] Unfortunately, the main reason behind this has been the increasing interventionist wage policy of the Government. Company and sectoral wage agreements in low-pay sectors also declined prior to the point at which the rise in the minimum wage took up the resources available for pay increase (i.e. 2000–2001 and 2006–2008). It was not only the crisis that limited the room for manoeuvre for companies, also wage compensation introduced as a result of recent changes in labour taxation implied that there is hardly anything to agree on locally in low-paid sectors (as well as the public sector). There were further factors that reduced the likelihood of local wage agreements: first, the restrictive regulation of industrial action introduced in 2010 (industrial action is typically used to give weight to wage demands), and second the stipulation of the new Labour Code declaring that publicly owned companies cannot deviate from the provisions of the Labour Code even with a collective agreement.

12 See data from the *collective agreement register* operated by the National Council for the Reconciliation of Interests, National Labour Office (Országos Érdekegyeztető Tanács, Nemzeti Munkaügyi Hivatal).

New platform for national social dialogue in the business sector with fewer partners and without legal guarantees

2011 was a turning point in social dialogue in Hungary: the National Council for the Reconciliation of Interests (Országos Érdekegyeztető Tanács, OÉT) was abolished together with other parallel bodies such as the Economic and Social Council (Gazdasági és Szociális Tanács, GSZT) and the Forum for Economic Coordination (Gazdasági Egyeztető Fórum, GEF). They were replaced by a high-profile body, the National Economic and Social Council (Nemzeti Gazdasági és Társadalmi Tanács, NGTT) that clearly did not aim to continue the intensive social dialogue. From the earlier system of social dialogue, only the National Council for Public Sector Dialogue (Országos Közszolgálati Érdekegyeztető Tanács, OKÉT) has been working on a continuous basis, although the influence of trade unions was hardly noticeable during the legislative boom of the public sector reform. While the supercharged legislation continuously adopted new laws affecting "the world of work", trade unions were losing ground in social dialogue (and to lesser extent, employers' organisations too). Understandably, trade unions were looking for the opportunity of dialogue, and through the International Labour Organisation (ILO) they successfully put pressure on the Government in the consultation of the new Labour Code. However, despite this, the Government only agreed to consult a selected group of social partners: on the side of trade unions they first consulted the League (Liga) and Workers' Councils and then included the National Confederation of Hungarian Trade Unions (Magyar Szakszervezetek

Országos Szövetsége, MSZOSZ). The employers' side was also limited to three confederations (the National Confederation of Entrepreneurs and Employers (Vállalkozók és Munkáltatók Országos Szövetsége, (VOSZ), the National Confederation of Employers and Industrialists (Munkaadók és Gyáriparosok Országos Szövetsége, MGYOSZ), and the National Confederation of General Consumer Cooperatives and Trading Companies (Általános Fogyasztási Szövetkezetek és Kereskedelmi Társaságok Országos Szövetsége, Áfeosz–Coop Szövetség). The first consultation that ended in a compromise was on some of the provisions of the new Labour Code that were particularly unfavourable for employees and trade unions, and then there were substantive consultations on some of the technical aspects of 2012's wage compensation arrangements (*Tóth,* 2012). During the selective, *ad hoc* consultations the concept of a new, permanent platform – the Business Sector and Government Permanent Consultative Forum (Versenyszféra és a Kormány Állandó Konzultációs Fórumának, VKF) – was born. The members of the new forum were the six social partners and the Government. The agreement setting up the new Forum was signed on 22 February, 2012. The main forum for consultation is the committee meeting that takes places as necessary but at least once every six months. Its members are the Prime Minister, the state secretary responsible for employment policy, the chief representatives of trade unions and employers' organisations, and the head of the Monitoring Committee. The Monitoring Committee is designated as a standing body to provide technical assistance to the work of the Forum. The main objective of the Forum is to discuss issues of national relevance that the founding agreement lists in seven categories.[13] The Government – according to some sources – decided to provide a 100-million-forint operating grant to each member to ensure adequate capacities for participation in the Forum's work. The smaller operating grant and the more limited membership – three trade union and six employers' confederations were left out – are not the only differences in comparison to the National Council for the Reconciliation of Interests. The Forum has no legal status (for example guaranteed participation in the legislative process) and institutional background, and despite the ambitious Agreement, it does not seem to discuss all of the issues listed there.[14] In addition to consultations behind closed doors, it seems that the Prime Minister continued his representative (and presumably informal) meetings with two selected trade union chiefs and the president of the Hungarian Chamber of Commerce and Industry (Magyar Kereskedelmi és Iparkamara, MKIK).

13 Megállapodás a Versenyszféra és a Kormány Állandó Konzultációs Fórumának létrehozásáról és ügyrendjének megállapításáról. (The agreement establishing the Business Sector and Government Permanent Consultative Forum).

14 The work of the Permanent Consultative Forum is not public either; therefore information can only be obtained indirectly from participants.

Emergence of alternative workers' representations

Therefore in the new national social dialogue instead of permanent forums and broad participation, a routine of *ad hoc* negotiations was developed with the participation of a limited number of actors selected by the Government. On the side of the business sector, it seems that the Hungarian Chamber of Commerce and Industry had a prominent role at the expense of traditional employers' organisations. A new feature was the appearance of alternative in-

terest representations for employees. Some of them used adequate tactics to create pressure, circumvent traditional forums and successfully negotiated with the Government (e.g. Hungarian Association of Junior Doctors). However the alternative movement launched by the armed forces in 2011 achieved nothing with its demonstrations. Furthermore the compulsory quasi-chamber system introduced in the public sector (the Hungarian Faculty of Public Service and the Hungarian Faculty of Security Forces, Magyar Közszolgálati Kar és Magyar Rendészeti Kar) and by the regulation of local trade union activity which is even more restrictive than in the business sector (for example employers are no longer required to deduct the membership fee from members' pay and transfer them to trade unions, they do not have the obligation to provide infrastructure for trade unions etc.) the Minister for the Interior effectively made the operation of trade unions impossible and it also seems deprived them of the majority of their members.

Revised regulation of local trade unions and collective bargaining

Considering that Hungary has developed a system of decentralised collective bargaining and collective agreements are also a precondition for increasing flexibility, the new regulation of the scope of local trade unions and collective agreements is an important development both in the context of employment contracts and wage regulation. As far as trade unions are concerned, an important change was that Act II of 1989 regulating their activity and legal supervision was repealed as of 1 January, 2012. The two new acts that replaced it require trade unions to renew their registration and make the necessary organisational and procedural changes approved by their membership. The most important changes in the life of local trade unions were brought about by the new Labour Code: the scope of legal protection and working time allowance for trade union officials were drastically reduced. According to the new rules establishments/premises with an average headcount of up to 500 employees in the previous year can have only one protected trade union official, establishments with 500–1,000 employees can have two; establishments with 1,000–2,000 employees can have three, four for up to 4,000 and five for more than 4,000. Protected trade union officials are entitled to reduced working time and they are given time off for the duration of consultations with the employer. However, according to the new rules they are no longer entitled to time off for participation in training for trade union officials. The total yearly working time allowance was reduced: they can reduce their working time by one hour per month for each two trade union members employed by the same employer. These provisions have been in force since 1 July, 2012 therefore working time allowances had to be adjusted accordingly for the rest of the year. According to the new Labour Code unused time allowances cannot be redeemed by the employer therefore local trade unions with larger membership (and indirectly sectoral trade unions and confederations) might suffer a significant loss of income.

Overall the law weakens the bargaining power of local trade unions, particularly in the public sector where they traditionally have been strongest

The new Labour Code also represents a radical retrograde step in the rights of trade unions. They lost their right to information and consultation – the right in certain cases and on certain issues now belongs exclusively to works councils. Employers are only required to provide information or consult trade unions if this has been initiated by the trade union. Trade unions' right to veto was also repealed (that could be used to suspend the implementation of – a limited scope of – unlawful measures by employers). In the future, trade unions will not be part of the electoral commission for works council elections. The provision that trade unions can only sign collective agreements jointly and therefore each employer can have only one collective agreement has not changed. The new act stipulates that the membership of the trade union must reach 10% of the total workforce so that it can participate in the negotiation of a collective agreement. Therefore in larger, predominantly national companies trade unions representing special groups of the workforce or smaller units might be excluded from collective bargaining. The law puts significant limitations on collective bargaining in publicly owned companies: they must not deviate from the rules on notice periods and redundancy pay, and the working time must not be shorter than that set out by the Labour Code unless in order to reduce or prevent a health hazard. Overall, the changes weaken the local bargaining power of trade unions, particularly in the public sector where they had been strongest.

The act – according to its justification – intends to give a greater role to works councils in the regulation of employment relationships. Works councils can sign works agreements and quasi-collective agreements – the latter only in the absence of a sectoral collective agreement or local trade unions. However, such quasi-collective company agreements must not regulate pay which is generally the most crucial issue in collective bargaining. Furthermore members of works councils must remain neutral during industrial action. At the same time works councils' right to co-decision – rather weak in Hungary anyway – has been restricted by the new law and they can no longer prevent the sale of welfare and social infrastructure. Sanctions for employers for failure to provide information or lack of consultation have been abolished and therefore – according to some – the regulation of works councils has become soft and unenforceable. The protection of works councils' members by labour law has become weaker and now only the president is entitled to this. However a positive development has been the introduction of a holding-level works council for holding companies.

Public service: mandatory membership in new workers' representation

According to the provisions of the act on civil servants a new self-governing public body – the Hungarian Faculty of Public Service (Magyar Kormánytisztviselői Kar) – was established on the 1st of July to represent the interests of civil servants. All civil servants automatically become members of the Faculty. According to the law its responsibilities include the representation of professional interests, upholding the prestige of the civil service, consultation on

legislation affecting the employment and working conditions of government officials, conducting ethics procedures, establishment of a prize, organising professional conferences and the provision of welfare, social and other services for its members. The operation of the Faculty is overseen by the Prosecution Service. Also on the 1st of July the Arbitration Commission for Government Officials (Kormánytisztviselői Döntőbizottság) was to resolve employment-related disputes in the civil service. Similar provisions apply to security forces where the Hungarian Faculty of Security Forces was established. Formally the legislation does not impact on the existence and rights of trade unions, however it remains to be seen how the parallel interest representations will work alongside each other.

Main legislation

170/2011 (24 August) on wage setting and guaranteed wage in public works employment; Government decree 298/2011 (22 December) on statutory minimum pay (minimum wage) and guaranteed minimum pay; Government decree 319/2011 (27 December) amending Government decree 170/2011 (24 August) on wage setting and guaranteed wage in public works employment, Government decree 169/2011 (24 August) on the Employment and Public Works Database, and Government decree 355/2009 (30 December) on the permit free employment of third country nationals in the Republic of Hungary; Act XCIII of 2011 on the National Economic and Social Council; Act XCIX of 2011 amending certain acts promoting the pay increase of low-paid workers; Act CLVI of 2011 on the amendment of taxation-related laws; Government decree 213/2011 (14 October) amending Government decree 138/1992 (8 October) on the implementation of Act XXXIII of 1992 in the public education system and Government decree 20/1997 (13 February) on the implementing regulations of Act LXXIX of 1993; Government decree 299/2011 (22 December) on the expected rate of pay increase to safeguard the net value of wages and the rate of non-salary benefits that might be included in this; Government decision 1013/2012 (26 January) on the preparation of employers' compensation to facilitate the safeguarding of the net value of wages in 2012; Government decree 69/2012 (6 April) on assistance to safeguarding the net value of wages and amending Government decree 299/2011 (22 December); Government decree 20/2012 (22 February) amending Government decree 371/2011 (31 December) on the compensation of employees in the public sector or in services of public interest in church provision in 2012; Act XXI of 2012 amending certain laws in relation to the implementation of expected pay increase and employment; Government decision 1504/2011 (29 December) on the provision of additional resources for the one-off payment of health care workers entitled to wage supplements; Government decree 371/2011 (31 December) on the compensation of employees in the public sector or in services of public interest in church provision in 2012; Government decision 1071/2012

(22 March) on possible directions of wage development for certain health care professionals; Act LXXIX of 2012 amending certain health care related acts; Act CLXXV of 2011 on the right of association, on public interest and the operation and funding of non-governmental organisations (Non-governmental Act); Act CLXXXI of 2011 on the court registration of non-governmental organisations and related procedural rules.
On-line sources: munka.hu

15. Measures related to migration and mobility

Minimum wage for EU Blue Card holders

From December 2011 the basic pay of workers employed holding the EU Blue Card must be higher than the minimum wage. The lowest pay must be no less than 150% of the previous year's average pay in the particular sector where the third-country national is employed. Only a few professions were exempt from this rule where the rate was set at 120%. The result of this rule might be the filtering of foreign workers – it is only worthwhile employing foreigners with significantly above average performance due to the higher cost. Thus, indirectly, it also means that Blue Card holders are not competing for jobs with low-skilled workers. However, this only applies to lawful employment. If foreign labour is significantly cheaper than locals, then this measure might increase the likelihood of illegal employment.[15]

15 The practical relevance of this measure is very limited because the Blue Card is not very popular. "In the first half of 2012 no EU Blue Cards were issued. On 30 June, 2012 there was only one valid EU Blue Card in the register that was issued in Hajdú-Bihar county." (*NFSZ,* 2012.)

Main legislation
Ministry of Interior decree 26/2012 (16 May) on the amendment of certain migration-related ministerial decrees; Government decree 81/2012 (18 April) on the amendment of migration-related government decrees and government decrees implementing Act XXVII of 2012.

16. The institutions of management, financing and evaluation of employment policy

The transformation of the institutional system of employment policy continued at a slower rate in 2012 with changes in the tasks and agencies of the National Labour Office already discussed above, as well as the expansion of the scope of government measures in relation to employment policy.

During this period the Government approved Priority 1 and 2 of SROP that finance the majority of employment policy measures. In addition to a number of other projects, it approved the funding and classification as a "priority project" of SROP's largest project, project 1.1.2. As a result of the 2012 state budget and a series of amendments of SROP, the share of passive measures was reduced within the budget of employment initiatives while more funding was allocated to public works, training and certain complex programmes (this is discussed in more detail in the section at the end of the chapter).

There were various events related to active ageing and inter-generational solidarity in 2012. The National Strategy for Social Inclusion (Nemzeti Társadal-

mi Felzárkóztatási Stratégia) was adopted in 2012; although this is not directly an employment policy issue, it is related to employment policy due to the large number of disadvantaged people.

In terms of public policy making there were some important conceptual changes that might have an impact on employment policies as well. One of these is the establishment of the National Office for Economic Planning. Although the activities of the Office are not directly related to employment policy, they include "providing support for human resources policy development". There was no information about the work of the Office prior to the submission of this manuscript.

The new National Reform Programme adopted in the framework of the Europe 2020 growth strategy in the spring of 2012 is the latest employment policy document of the Government. The document – largely based on Széll Kálmán Plan 2.0 – confirms earlier employment targets (75% for 20–64 year olds), highlighting the objectives also presented here, such as increasing activation, the expansion of employment in public works, increasing the flexibility of employment, strengthening the dual system of vocational education and training. Unlike previous programmes, this one has not been approved by a Government decision. Reviewing the implementation of the previous Reform Programme the European Commission proposed strengthening the capacities of the National Employment Service, the development of pathways out of public works employment and increasing the share of personalised programmes.

The *Big book of reforms – the Hungarian way to growth and employment leading to sustainable development* was published giving an overview of the main changes since the Government's entry into office. Employment policy is discussed in Chapter 5.

The Government joined the international initiative Open Government Partnership and as a result, the public can learn more about the details of governmental decision making. Parliament adopted the act on the re-use of public data, informational self-determination and freedom of information. These provisions – in theory – will facilitate access to data for governmental impact assessment and analysis and also secondary analysis of the data by third parties. Although further details are not known, this is also facilitated by the progressive set of provisions put forward by the government decree on strategic governance. Although, unfortunately, this exempts a number of areas (such as budget, spending of EU funding) from the requirement of in-depth impact assessment, in general it puts forward clear and progressive principles.

Main legislation

Government decree 248/2011 establishing the National Office for Economic Planning; Government decision 1408/2011 on measures related to the establishment of the National Office for Economic Planning; Government decree 38/2012. (12 March) on strategic governance; Government decision 1089/2012

(2 April) on the Hungarian programme for the European year of active ageing and inter-generational solidarity; Government decree 1430/2011 on the National Social Inclusion Strategy and governmental action plan for the implementation of the Strategy in 2012–2014; Government decree 169/2011 (24 August) on the Employment and Public Works Database; Act XXV of 2012 on informational self-determination and amending Act CXII of 2011 on freedom of information; Act LXIII of 2012 on re-using public data; Government decision 1171/2012 on tasks related to re-using public data; Government decision 1227/2012 (6 July) on Hungary's participation in the international initiative Open Government Partnership; Government decision 1246/2011 (8 July) approving funding for SROP 1.1.2 priority project "Improving the employability of disadvantaged populations (De-centralised programmes in convergence regions)"; Government decision 1235/2012 (12 July) setting Priorities 1 and 2 of the 2011–2013 Action Plan of the Social Renewal Operational Programme.
On-line sources: kormany.hu

Centres of gravity in the financing of employment policy in 2011–2012*

ZSOMBOR CSERES-GERGELY

The above has discussed policy changes in Hungary without analysing the impact of individual measures on the development of employment policy. No matter how effective a policy instrument is in theory, it will only be effective in practice if it receives adequate emphasis in the policy. This is influenced by a number of factors in implementation: the actual political and economic environment, the operation of the organisations concerned and the level of funding [these issues are addressed in detail by *Fazekas and Scharle* (2012) and *ÁSZ* (2012)]. This section aims to explore – to the extent it is possible with the use of publicly available data – how the allocation of financial resources reflects the emphasis on different policy objectives. Only labour market measures discussed in sections 1–9 will be addressed here and the non-labour market measures presented under sections 10–16 will not be included in the analysis, even though these might have a larger impact on behaviour than employment policy, and their costs might also be comparable (a general tax cut would be an example of both). This decision is based on methodological considerations: there might be different ways of assigning spending to employment policy and the method might depend heavily on the objectives of the analysis.

The difficulty of identifying sources of finance

Currently, labour market policies can be financed exclusively or jointly from national or European Union development funds. This duality has implications for planning, monitoring and reporting as well. There are interventions that are implemented on their own (for example the Start contribution relief schemes) while other interventions are implemented as part of a complex programme (for example wage subsidies for disadvantaged people). One intervention might have one or more "measures" that are identical in terms of content but might differ in terms of implementation. This also means that one type of intervention might be found at various places.

* I would like to thank *Irén Busch, Judit Nagy, Balázs Romhányi and Sándor Ádám* for their comments on the draft chapter. Any remaining errors or inaccuracies are my sole responsibility.

Considering that the basic unit of policy is not individual measures – which might be numerous – but types of measures, costs should also be considered at this level. To this the reporting of individual measures and types of financing should be harmonised, first of all – in order to improve clarity of data – to ensure that they refer to the same time period and consider to what extent operating costs of organisations can be included in the cost of projects. Basically, the task proposed by *Marczell and Romhányi* (2010) for the goal-oriented reform of the state budget should be carried out for employment policy. However, it is only possible to cover all relevant areas if all sources of finance are taken into account and all types of intervention are identified within projects. Although programme evaluations are different in terms of their final objectives – that is the opposite of what we are trying to do here – there are some similar steps involved, for example disaggregating programmes into smaller, comparable units. These elements can then be combined into more homogenous units. As will be shown, this is not possible on the basis of currently available public data. Therefore, the main question is what conclusions can be drawn on the basis of available data using the second best method.

One of the main sources of funding for employment policy is the central budget of Hungary. The budget appropriations are set out in the Budget Act[**] and the actual expenditures are presented by the Budgetary Discharge Act. For the real time analysis of employment policy only the appropriations can be used, however some caution is necessary because planned and actual spending might be significantly different (as in 2010). Both acts discuss the budget in the same detail, and they are the most detailed publicly available documents.

The objectives and strategy of employment policy are described in various documents as illustrated by Figure 1 of *ÁSZ* (2012). The budget is not structured according to policies but according to institutions and its relevant sections can complement the Government's economic policy documents that often lack information on spending. Interventions can appear in the document on their own or combined with other interventions, assigned to institutions or separately. Although its structure would allow it however the authors of the budget do not seem to be interested in improving the transparency of policies. Information about the planned and actual expenditure of interventions in the general ledger accounts is not available to the public. Generally, the budget combines all interventions in a single unit, the National Employment Fund (in Hungarian: Nemzeti Foglalkoztatási Alap, NFA, previously the Labour Market Fund, LMF in Hungarian: Munkaerő-piaci Alap, MpA), which is ring-fenced and managed separately, although there have been some changes here. For example the operating costs of the National Employment Service (NES) were previously part of the LMF, but this is no longer the case. This is due to the activities of the NES and some management considerations. On the one hand the tasks of the NES changed considerably as a result of the merger of occupational health and safety as well as the creation of the new network of rehabilitation authorities. On the other hand putting government offices in the centre makes it increasingly difficult to identify the actual operating cost of the network even in the absence of any major changes in work organisation.

The budget for employment in 2011 and 2012

The budget of NFA is presented in Chapter LXIII of the budget act. *Table A1* presents actual spending for 2011 from the Budgetary Discharge Bill and appropriations for 2012 from the Budget Act, where necessary adjusted for minor changes during the year.

Some well-known policy instruments can be easily identified in the table: wage subsidy type employment incentives (contribution discounts and the normative subsidies of SROP 1.2), direct job creation by public works programmes (Start work), some of the training subsidies (vocational training and adult learning subsidies), and cash benefits to job seekers as part of LMP subsidies (job seekers' benefits). Further items are however mixed – in the case

[**] The term "2012 budget" refers to Act CLXXXVIII of 2011 on Hungary's budget for 2012.

of employment and training subsidies even their name suggest the duality of objectives. According to this table the budget for the employment policy was around 300 billion forints in both years.

Table A1: NFA (previously MpA) spending in the budget, harmonised data

	Amount (billion forints)		Share (percentage)		Increase
	2011	2012	2011	2012	2012/2011
Active measures	30.923	31.600	10.9	10.3	2.2
Employment and training subsidies	25.775	25.600	9.1	8.3	–0.7
Reimbursement of contribution discount	5.148	6.000	1.8	2.0	16.6
Vocational training and adult learning subsidies	27.921	23.483	9.8	7.6	–15.9
Expenditure on passive measures	125.765	58.700	44.3	19.1	–53.3
Job seekers' assistance	124.543	57.000	43.9	18.5	–54.2
Transfer to Pension Insurance Fund	1.222	1.700	0.4	0.6	39.2
Wage guarantee payments	5.363	6.000	1.9	2.0	11.9
Operating costs	0.087	0.300	0.0	0.1	246.0
Start Employment Programme (2011: public works)	59.800	132.183	21.1	43.0	121.0
Retention balance and risk management allocation	0.000	2.000	0.0	0.7	
EU pre- and co-financing	33.500	53.367	11.8	17.3	59.3
SROP 1.1 Employment services and assistance	19.754	37.900	7.0	12.3	91.9
SROP 1.2 Normative employment incentives	9.775	8.500	3.4	2.8	–13.0
EU co-financing for employability and adaptability	3.971	6.967	1.4	2.3	75.5
Other	0.304	0.0	0.1	0.0	
Total	283.662	307.632	100.0	100.0	8.5

Note: 2011 data are final numbers from the budgetary discharge while 2012 indicated planned expenditure at current value. In 2011 the Fund was called the *Labour Market Fund*, in 2012 the *National Employment Fund*. At the end of January, 2013 one euro was equivalent to approximately 290 Hungarian forints.
Source: Bill on the "Implementation of Act CLXIX of 2010 on the 2011 budget of the Republic of Hungary" (budgetary discharge, Annex 1) Act CLXXXVIII of 2011, *Hungarian Official Gazette,* Year 2011, number 161, p. 39 337.

Nevertheless the NFA does not include the total budget of the employment policy; however based on the institutional structure of the employment policy other sources can be identified in other parts of the state budget. As has already been mentioned, since 1 January 2011 operating costs have no longer been included in the NFA, such as the operating costs of the National Employment Service. The appropriation for its central coordination unit, the National Labour Office, can be found under Heading 4, Chapter 15 of the Ministry for National Economy (p 39,313) – the structure is less relevant here, however the budget of 4.7 billion forints is and should be added to the above sum. The implementing bodies of the NES are made up of local job centres that now operate as part of government offices and thus they are not listed separately in the budget. They are part of the 107-billion-forint appropriation under Heading 8 (Chapter 10) of the Ministry of Public Administration and Justice but their share is not known and would be difficult to calculate. The budget of the former Employment Service, minus the NLO, that amounted to approximately 20 billion forints might help to estimate their current budget. Similarly the operating cost of the State Secretariat for Employment Policy could be included here (if it were known, but it is not because it is not listed separately in the 6.8 billion forints appropriation under Head-

ing 1, Chapter 15), or the State Secretariat of Public Works in the Ministry of Interior (again cannot be identified within the total budget of 3.8 billion forints of the Ministry), or the approximately 0.4 billion budget of the National Employment Public Non-profit Ltd. Of course the list could continue and include for example the operating grant (0.5 billion forints) to the Hungarian Chamber of Commerce and Industry that plays an important role in vocational education and training, or the 4.5-billion-forint budget of the István Türr Training and Research Institute that takes part in the training and education of public workers, or more importantly the National Office for Rehabilitation and Social Affairs and related rehabilitation authorities with their budget of more than 4 billion forints. Although this is not an exhaustive list – due to the uncertain status of some institutions, it cannot be exhaustive – it identifies the most important missing items. If these are all included then the nationally financed employment policy budget was approximately 340 billion forints in 2012.

The share of employment policy within the state budget increased only slightly by 2012 but its structure changed significantly. In 2011 a large part – just over 40% – of the budget was made up of passive benefits. In second place was public works with approximately 20% of the budget and lastly the share of other active assistance, vocational training and EU-funded complex programmes was around 10%. This changed in 2012. In addition to a moderate increase in the share of complex programmes and a similar decline in the direct financing of vocational training, the planned share of passive benefits and public works switched places. Nevertheless it would be premature to make any final conclusions about changes in the weight of vocational training: as will be shown, the sum available for similar purposes in SROP 2.1.3 increased to a similar extent, and this might not be a coincidence.

Although *Table A1* and its discussion include the EU-funded programmes of the NFA, it does not list all of these sources. The spending of EU funds is based on operational programmes such as the Social Renewal Operational Programme (SROP). Operational programmes are broken down into priorities and each priority includes measures and projects. There are a number of projects in the operational programmes that have primary or secondary objectives related to employment policy. This is especially the case for SROP – Priority 1 and 2 include projects that are clearly and directly based on employment policy instruments. Projects under Priority 5 combine social policy and employment policy objectives. In principle, there might be employment policy elements in the Social Infrastructure Operational Programmes (SIOP) as well, that is closely related to SROP.

It is related to the administration of projects, however it is of key importance here, that two groups can be distinguished based on funding. In some projects (they are the majority) funding closely follows the availability of money, and there are projects that are pre-financed by the NFA (MpA) before the availability of EU funding, therefore the money appears in its budget. Although these projects in Priority 1 are large in terms of their budget, nevertheless they do not cover most of the policy budget. When considering these, we need to take into account the fact that due to the system of pre-financing and the reimbursement of money later, appropriations in a given year might be related to a completely different project phase.

Apart from SROP and SIOP, it is not possible to rely on the title of projects, there needs to be some form of content analysis to decide whether there are employment policy related projects in other operational programmes as well. Here the simplest method was used: we searched for the strings "foglal" ("empl*") and "munkahely" ("job") in the text of action plans that set out the content of operational programmes at the level of projects and listed the projects where the title or the description contained either or both of these terms. Of course, this method has its weaknesses, however for a more detailed analysis all calls for proposals should be reviewed individually. This method revealed that there are projects with employment policy objectives in Priority 2 and 3 of the Economic Development Operational Programme (EDOP) and also in regional (plan-

ning regions) operational programmes. Although the latter do not identify employment policy objectives explicitly, they highlight the importance of job creation. The Environment and Energy Operational Programme (EEOP) and the Transport Operational Programme (TOP) do not contain any form of the words *job* or *employment*. Projects identified using the above method are presented in *Table A2*. The first column displays the code of the project and the last column provides a brief description. The projects of regional operational programmes are not included in the table because the share of employment policy compared to other projects would be even more difficult to identify.

Table A2: Labour market programmes outside the NFA (MpA) financed by the EU; maximum amount of commitment according to indicative resource allocation (billion forints)

OP priority, interventions	April 2011				December 2011, total	August 2012				Abbreviated name/reference in the action plan
	11	12	13	total		11	12	13	total	
Priority 2, EDOP				54.0	54.0				54.0	
2.1.3				45.0	45.0	15.0	15.0	15.0	45.0	Complex technology development and employment
2.2.4				9.0	9.0	3.0	3.0	3.0	9.0	SME job creation
Priority 2, EDOP				27.0	27.0				27.0	
3.3.2				27.0	27.0	9.0	9.0	9.0	27.0	Competitiveness programme, "... wage costs of new workers"
Priority 3, SIOP				6.0	6.0				6.0	
3.2.1				6.0	6.0	6.0			6.0	"The project aims to improve the effectiveness and efficiency of active labour market policies..."
Priority 1, SROP				118.3	126.7				158.5	
1.1.1	21.7			21.7	11.7		11.7		11.7	Rehabilitation and employment of people with partial work capacity
1.1.2	60.0			60.0	86.0	86.0	20.0		106.0	Decentralised complex programme for disadvantaged people
1.1.4	5.0			5.0	5.0	5.0	2.0		7.0	1.1.2 Central Hungary region equivalent
1.2.1	8.5			8.5	7.4		14.5		14.5	Start Plus and Extra
1.3.1		7.0		7.0	3.0		3.0		3.0	NES development
1.4.1	1.5	1.5	1.5	4.5	4.5	1.5	5.0		6.5	Assistance to community-based employment projects
1.4.3	2.0	2.0		4.0	4.7		4.7		4.7	Employment pilot programmes
1.4.5	1.4	1.0	1.0	3.4	1.4		1.4		1.4	Employment pacts
1.4.6	2.0	1.2	1.0	4.2	3.0		3.0		3.0	Transitional employment in the construction industry
1.4.7							0.7		0.7	Professional development related to employment programmes
Priority 2, SROP				109.8	116.9				130.1	
2.1.2	9.0			9.0	13.0		13.0		13.0	Foreign language and IT competencies
2.1.3	2.5	3.3	2.0	7.8	21.0	7.8	13.2		21.0	Workplace training
2.1.6	19.8			19.8	20.1		20.1		20.1	"Studying again"
2.2.1	4.7			4.7	4.7		5.6		5.6	Development of the content of vocational training
2.2.4	0.9			0.9	0.9	0.9			0.9	Cross-border cooperation
2.2.5							4.5		4.5	Development of vocational training institutions
2.2.6							1.4		1.4	Training and professional development of teachers in vocational education and training

OP priority, interventions	April 2011				December 2011, total	August 2012				Abbreviated name/reference in the action plan
	11	12	13	total		11	12	13	total	
2.2.7							11.4		11.4	Developments related to the dual system of vocational training
2.3.4	20.0	20.0	20.0	60.0	18.0					Supporting hiring in SMEs
2.3.4.A							8.5		8.5	Supporting students with study agreements
2.3.4.B							1.2		1.2	Professional development of tutors
2.3.6.					6.9		6.9		6.9	Supporting business start-up among young people
2.4.3.D					15.0		15.0		15.0	Development of social economy
2.4.3.E							0.8		0.8	Development of non-government organisation in the social economy
2.4.5	2.0	2.0	2.0	6.0	8.0		10.4		10.4	Development of day care provision for young children at the workplace
2.4.8					3.8		3.9		3.9	Health and safety at work
2.5.3					3.9		3.9		3.9	Economic and social cooperation
2.6.2	1.6			1.6	1.6		1.6		1.6	Support to non-governmental service providers
Priority 5, SROP				30.8	32.6				32.6	
5.1.1	2.0			2.0	2.0				2.0	Supporting projects in multiple disadvantaged small regions
5.3.1		4.9		4.9	3.3				3.3	Enabling and development of independent living skills for people with low employability
5.3.1-B-1					1.5				1.5	Work-based training of Roma people in the social care and child welfare system
5.3.1-B-2	1.4			1.4	1.4				1.4	Work-based training of Roma people in the social care and child welfare system
5.3.2		1.1		1.1	0.1				0.1	Technical and methodological assistance to the programme "Supporting the social and labour market re-integration of homeless people who are sleeping rough"
5.3.3.	2.0			2.0	2.1				2.1	Supporting the social and labour market re-integration of homeless people who are sleeping rough
5.3.8.	19.4			19.4						
5.3.8-A					9.6				9.6	Motivational training and support services to improve the labour market prospects of the most disadvantaged
5.3.8-B					7.3				7.3	Motivational training and support services to improve the labour market prospects of the most disadvantaged
5.3.9					2.0				2.0	Study partnerships to improve employability
5.3.10					3.3				3.3	Enable/motivational training, support services to prepare the most disadvantaged to successfully take part in traditional training/employment programmes
Total without 1.1 and 1.2				250.0	253.0				269.0	
Total				346.0	363.0				408.0	

Source: April 2011 figures: 1094/2011 (13 April), changes: Government decision 1453/2011 (22 December) and Government decision 1235/2012 (12 July), and the Action Plans of the *New Széchenyi Programme* for the other SROP priorities and action plans.

In order to link *Table A2* to the budget, at least the planned schedule of spending should be available for each identified programme; however this was not the case. Although relatively detailed information is available about projects funded from EU sources and they can also be closely followed up to the publication of calls for proposals, very little is known about actual spending particularly in the disbursement phase. The Action Plans for the period 2011–2013 set out the indicative annual budget for each project – the figures for each amendment of the action plan are displayed in the middle columns of *Table A2*. However, these data do not provide any information about implementation either. On the one hand, this is natural: actual spending depends on many unforeseeable factors, including the timing of calls for proposals and the submission of projects. On the other hand, this is limited by the type of documentation that does not record the disbursement following – sometimes years after – contracting. Although actual implementation is closely monitored by the National Development Agency, the information is not published. According to experts, this information is not included in Monitoring Reports that are not public documents either. Instead, data aggregated by priority are reported. This is an additional difficulty for projects that are no longer included in the current action plans because although payment is still on-going, new contracts for implementation are not signed. Thus, there is no information about costs of individual projects even after their conclusion. Therefore there is limited knowledge about the implementation of larger units. Assuming that the available budget will be spent and items carried over are disregarded, one might argue that the total budget available for labour market policies is at least 90 billion forints per year larger than that estimated on the basis of the state budget. This is a considerable sum in itself, but compared to the budget of approximately 340 billion forints, it is very significant: nearly its quarter. Therefore the estimated sum for labour market policies is around 430 billion forints that is 40% higher than that based only on NFA sources.

Even if we cannot analyse the schedule and the current policy structure– mainly due to items carried over in the budget – the action plan gives an accurate picture of policy changes. Columns 2–5 reflect the situation in April 2011[***], then two changes show the effects of the comprehensive amendment of SROP and TIOP in the winter of 2011, and amendment of SROP Priority 1 and 2 in the summer of 2012. The contribution of other operational programmes is set at 87 billion forints. The total available budget increased by about 50 billion forints as a result of these changes which is mainly due to the nearly 20 billion forints increase two times in the budget of complex project 1.1.2, and on the other hand, to a lesser degree, the increase in funding available for Start schemes, vocational training, workplace training, including additionally some new schemes. Finally there are a fairly large number of new schemes in areas related to the social economy, day-care for children etc. The sum originally available for the modernisation of NES was significantly reduced, or rather re-allocated to SIOP Priority 3.2.1, and funding available for vocational rehabilitation in Project 1.1.1 was also reduced. The programme supporting SMEs to hire new workers (SROP 2.3.4), which was originally allocated 60 billion forints, was scrapped. Also for projects that retained all or most of the original budget, there was some re-allocation of resources, typically from 2011 to 2012 – this might have been due to unsuccessful calls for proposals or difficulties of co-financing.

Conclusions

Hopefully the above has shown the type of information that would be needed for a detailed overview of the budget for labour market policies. Firstly, taking stock of labour market spending in the state budget

[***] At the beginning of 2011 SROP had two general revisions in January and April as a result of government decisions 1013/2011 (9 January) and 1094/2011 (13 April). Then there were various minor amendments such as changes in priorities 3, 4 and 6. The table indicates this version.

(this is nearly happening), and details on the main budget titles. The latter would be partly doable on the basis of treasury accounts. Projects funded by the EU pose more of a problem. Here a more detailed analysis of their content would be necessary, similarly to other types of projects, and of an adequate scale so that all potential sources are considered. On the other hand, actual figures would be necessary that indicate not only the planned but the actual cost of projects. This would be the only way to find out to what extent employment policy applied different types of measures.

Nonetheless, it is not without purpose to collate all available information because it provides an approximate picture of the role of individual measures in employment policy – changing over the years – and thus it helps to show the real significance of interventions.

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STATISTICAL DATA

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Statistical tables on labour market trends that have been published in The Hungarian Labour Market Yearbooks since 2000 can be downloaded in full from the website of the Research Centre for Economic and Regional Studies: http://adatbank.mtakti.hu/tukor

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DATA SOURCES

CIRCA	Communication & Information Resource Centre Administrator
KSH	Table compiled from regular Hungarian Central Statistical Office publications [Központi Statisztikai Hivatal]
KSH IMS	HCSO institution-based labour statistics [KSH intézményi munkaügyi statisztika]
KSH MEF	HCSO Labour Force Survey [KSH Munkaerő-felmérés]
KSH MEM	HCSO Labour Force Account [KSH Munkaerő-mérleg]
NAV	National Tax and Customs Administration [Nemzeti Adó- és Vámhivatal]
NEFMI	Ministry of National Resources [Nemzeti Erőforrás Minisztérium]
NEFMI EMMI STAT	Ministry of National Resources, Educational Statistics [Nemzeti Erőforrás Minisztérium, Oktatásstatisztika]
NFA	National Market Fund [Nemzeti Foglalkoztatási Alap]
NFSZ	National Employment Service [Nemzeti Foglalkoztatási Szolgálat]
NFSZ IR	NFSZ integrated tracking system [NFSZ Integrált (nyilvántartási) Rendszer]
NFSZ REG	National Employment Service Unemployment Register [NFSZ regisztere]
NGM	Ministry of National Economy [Nemzetgazdasági Minisztérium]
NMH	National Labour Office [Nemzeti Munkaügyi Hivatal]
NMH BT	National Labour Office Wage Survey [NMH Bértarifa-felvétel]
NMH PROG	National Labour Office Short-term Labour Market Projection Survey [NMH Rövid Távú Munkaerőpiaci Prognózis]
NSZ	Population Census [Népszámlálás]
NYUFIG	Pension Administration [Nyugdíjfolyósító Igazgatóság]
ONYF	Central Administration of National Pension Insurance [Országos Nyugdíjbiztosítási Főigazgatóság]
TB	Social Security Records [Társadalombiztosítás]

EXPLANATION OF SYMBOLS

(–)	Non-occurence.
(..)	Not available.
(n.a.)	Not applicable.
(...)	Data cannot be given due to data privacy restrictions.

Table 1.1: Basic economic indicators

BPDATA

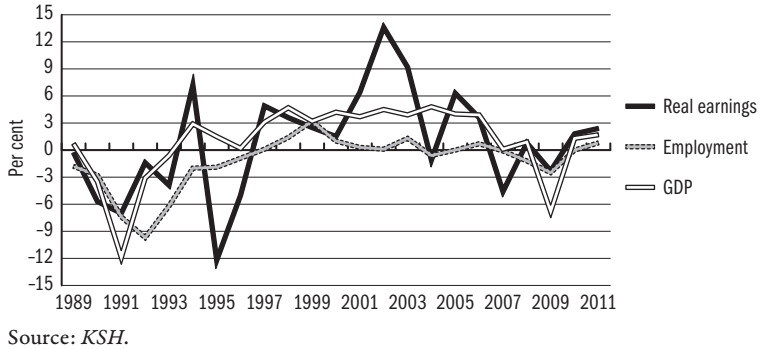
Year	GDP[a]	Industrial production[b]	Export[c]	Import[c]	Real earnings[d]	Employment[d]	Consumer price index[d]	Unemployment rate
1990	96.5	90.7	95.9	94.8	94.3	97.2	128.9	..
1995	101.5	104.6	108.4	96.1	87.8	98.1	128.2	10.2
1996	100.2	103.4	104.6	105.5	95.0	99.1	123.6	9.9
1997	103.1	111.1	129.9	126.4	104.9	100.1	118.3	8.7
1998	104.7	112.5	122.1	124.9	103.6	101.4	114.3	7.8
1999	103.2	110.4	115.9	114.3	102.5	103.2	110.0	7.0
2000	104.2	118.1	121.7	120.8	101.5	101.0	109.8	6.4
2001	103.7	103.7	107.7	104.0	106.4	100.3	109.2	5.7
2002	104.5	103.2	105.9	105.1	113.6	100.1	105.3	5.8
2003	103.9	106.9	109.1	110.1	109.2	101.3	104.7	5.9
2004	104.8	107.8	118.4	115.2	98.9	99.4	106.8	6.1
2005	104.0	106.8	111.5	106.1	106.3	100.0	103.6	7.2
2006	103.9	109.9	118.0	114.4	103.6	100.7	103.9	7.5
2007	100.1	107.9	115.8	112.0	95.4	99.9	108.0	7.4
2008	100.9	100.0	104.2	104.3	100.8	98.8	106.1	7.8
2009	93.2	82.2	87.3	82.9	97.7	97.5	104.2	10.0
2010	101.3	110.6	116.8	115.1	101.8	100.0	104.9	11.2
2011	101.7	105.4	110.2	106.9	102.4	100.8	103.9	10.9

[a] After 1996 there was a change in the methodology for accounting the undivided service fee of financial intermediation. Previous year = 100.
[b] 1990–2000: those with more than 5 employees, 2001–: without water and waste management, including businesses with fewer than 5 employees. Previous year = 100.
[c] Volume index. Previous year = 100.
[d] Previous year = 100.
Source: GDP: 1990–2010: *STADAT* (2011. 09. 30. version), 2011: *Statistical Pocketbook*; Industrial production index: 2001–: *STADAT* (2012. 05. 17. version), 2011. year preliminary data; Export and import: 2001–: *STADAT* (2010. 03. 02. version); Employment: 1990: *KSH MEM*; 1995–: *KSH MEF*. Other data: *CSO*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent01_01

BPDATA

Figure 1.1: Annual changes of basic economic indicators

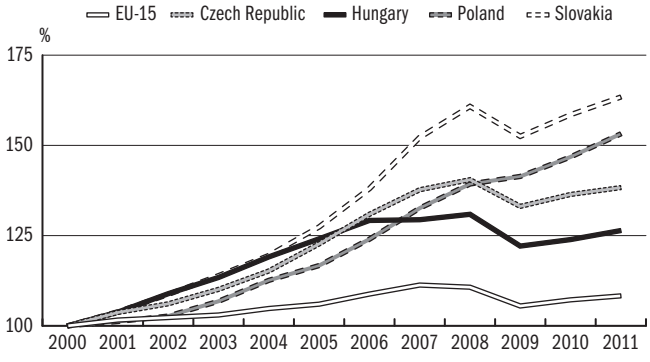


Source: *KSH*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena01_01

BPDATA

Figure 1.2: Annual GDP time series (2000 = 100%)

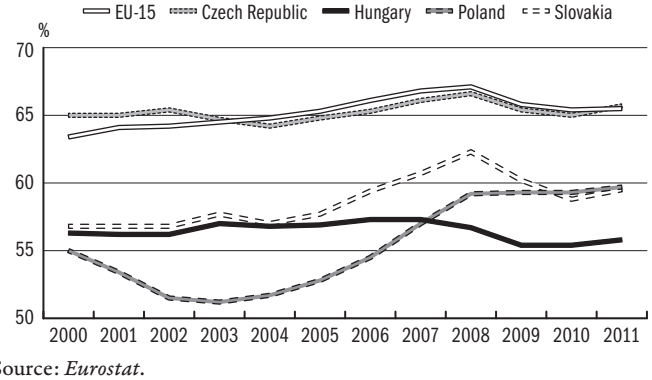


Source: *Eurostat*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena01_02

BPDATA

Figure 1.3: Employment rate of population aged 15-64



Source: *Eurostat*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena01_03

Table 2.1: Population[a]

BPDATA

Year	In thousands	1992 = 100	Annual changes	Population age 15-64, in thousands	Demographic dependency rate	
					Total population[b]	Old age[c]
1990	10,375	100.4	-0.2	6,870.4	0.51	0.20
1995	10,337	99.6	-0.1	6,986.9	0.48	0.21
2000	10,221	98.5	-0.3	6,961.3	0.47	0.21
2001	10,200	98.3	-0.2	6,963.3	0.46	0.22
2002	10,175	98.1	-0.2	6,962.8	0.46	0.22
2003	10,142	97.8	-0.3	6,949.4	0.46	0.22
2004	10,117	97.5	-0.3	6,943.5	0.46	0.23
2005	10,098	97.3	-0.2	6,940.3	0.45	0.23
2006	10,077	97.1	-0.2	6,931.8	0.45	0.23
2007	10,066	97.0	-0.1	6,931.3	0.45	0.23
2008	10,045	96.8	-0.2	6,912.7	0.45	0.24
2009	10,031	96.7	-0.1	6,898.1	0.45	0.24
2010	10,014	96.5	-0.1	6,874.0	0.46	0.24
2011	9,986	96.3	-0.2	6,857.4	0.46	0.24
2012	9,958	96.0	-0.3	6,835.4	0.46	0.25

[a] January 1st. Recalculated on the basis of Population Census 2001.
[b] (population age 0–14 + 65 and above) / (population age 15–64)
[c] (population age 65 and above) / (population age 15–64)
Source: *KSH*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent02_01

Table 2.2: Population by age groups, in thousands[a]

BPDATA

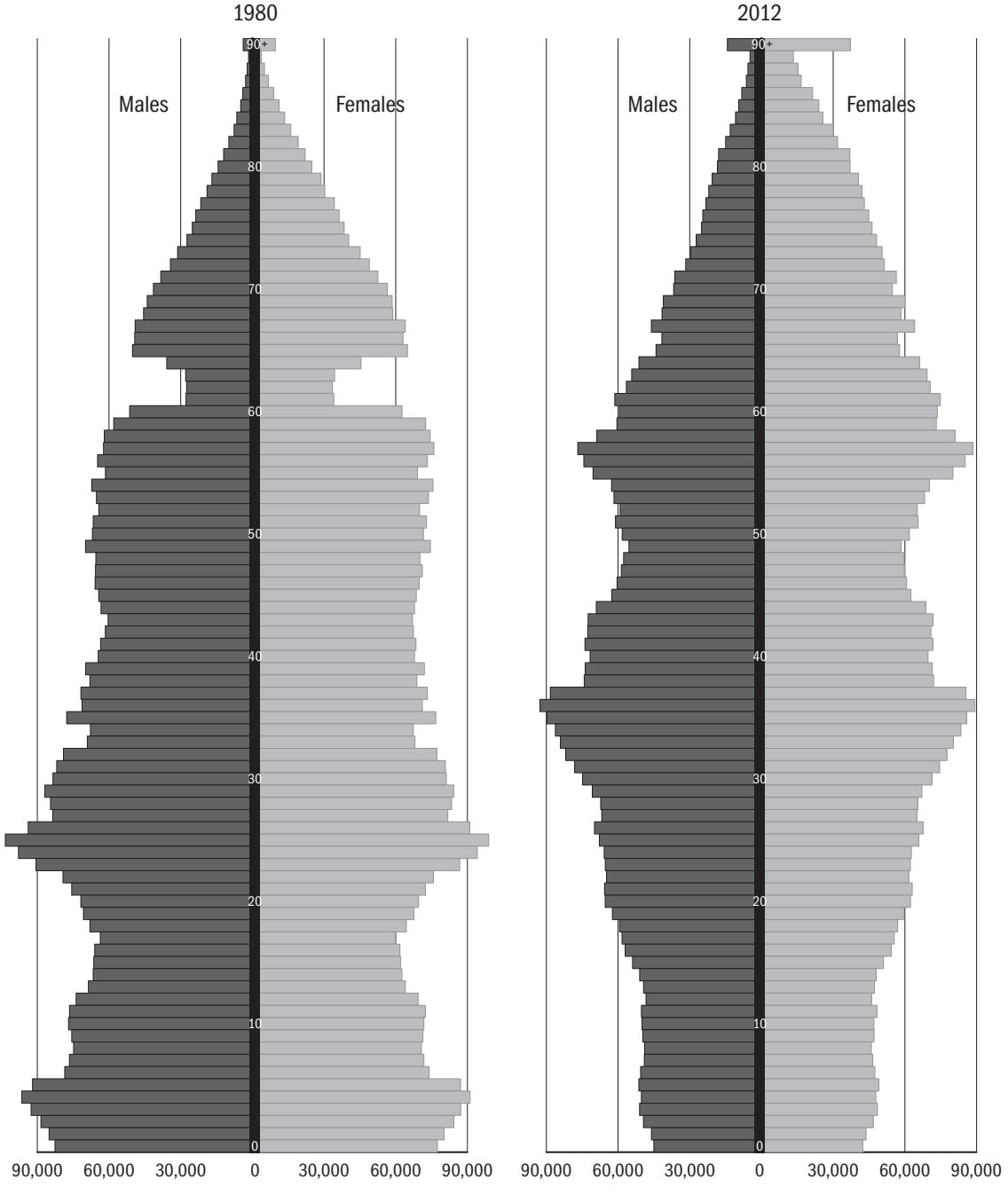
Year	0–14	15–24	25–54	55–64	65+	Total
			years old			
1990	2,130.5	1,445.5	4,231.4	1,193.5	1,373.9	10,374.8
1995	1,891.7	1,610.1	4,250.6	1,126.2	1,458.0	10,336.7
2000	1,729.2	1,526.5	4,291.4	1,143.4	1,531.1	10,221.6
2001	1,692.0	1,480.1	4,338.5	1,144.7	1,545.0	10,200.3
2002	1,660.1	1,436.9	4,378.0	1,147.9	1,551.9	10,174.9
2003	1,633.7	1,392.5	4,390.8	1,166.1	1,559.2	10,142.4
2004	1,606.1	1,355.0	4,401.6	1,186.9	1,567.1	10,116.7
2005	1,579.7	1,322.0	4,409.1	1,209.2	1,577.6	10,097.6
2006	1,553.5	1,302.0	4,399.8	1,230.0	1,590.7	10,076.6
2007	1,529.7	1,285.9	4,393.9	1,251.5	1,605.1	10,066.1
2008	1,508.8	1,273.3	4,377.1	1,262.3	1,623.9	10,045.4
2009	1,492.6	1,259.9	4,346.1	1,292.0	1,640.3	10,030.9
2010	1,476.9	1,253.4	4,293.7	1,326.9	1,663.5	10,014.4
2011	1,457.2	1,231.7	4,257.7	1,367.8	1,671.3	9,985.7
2012	1,441.8	1,207.3	4,231.8	1,396.3	1,680.6	9,957.7

[a] January 1st. Recalculated on the basis of Population Census 2001.
Source: *KSH*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent02_02

BPDATA

Figure 2.1: Age structure of the Hungarian population, 1980, 2012



Source: *KSH*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena02_01

BPDATA

Table 2.3: Male population by age groups, in thousands[a]

Year	0–14	15–24	25–59	60–64	65+	Total
			years old			
1980	1,205.4	749.9	2,475.6	170.5	587.3	5,188.7
1990	1,090.4	740.3	2,366.9	259.9	527.5	4,984.9
1998	916.8	815.4	2,375.5	229.3	564.7	4,901.8
1999	901.5	805.0	2,383.2	226.1	568.6	4,884.4
2000	885.0	780.9	2,403.8	224.8	570.8	4,865.2
2001	865.7	757.0	2,425.2	228.9	574.2	4,851.0
2002	850.1	733.9	2,446.1	233.0	573.8	4,837.0
2003	836.8	711.3	2,456.5	239.9	574.0	4,818.5
2004	823.0	691.9	2,470.3	244.4	574.5	4,804.1
2005	809.5	674.6	2,480.0	252.2	576.8	4,793.1
2006	796.7	664.0	2,493.7	249.3	580.9	4,784.6
2007	784.5	655.4	2,503.7	249.4	586.1	4,779.1
2008	773.9	649.2	2,501.3	252.5	592.8	4,769.6
2009	765.8	642.7	2,497.0	258.4	599.2	4,763.1
2010	757.7	640.4	2,488.8	261.7	608.3	4,756.9
2011	747.6	629.7	2,480.4	274.7	611.5	4,743.9
2012	739.7	618.0	2,475.1	282.9	616.0	4,731.7

[a] January 1st. Recalculated on the basis of Population Census 2001.
Source: *KSH*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent02_03

BPDATA

Table 2.4: Female population by age groups, in thousands[a]

Year	0–14	15–24	25–54	55–59	60+	Total
			years old			
1980	1,135.8	714.5	2,232.8	365.3	1,072.4	5,520.8
1990	1,040.1	705.2	2,144.4	327.6	1,172.5	5,389.9
1998	876.0	777.6	2,156.0	324.4	1,243.9	5,378.0
1999	861.0	768.2	2,159.3	326.7	1,253.8	5,369.0
2000	844.3	745.6	2,170.5	334.8	1,261.3	5,356.5
2001	826.3	723.1	2,193.4	330.4	1,276.1	5,349.3
2002	810.0	703.0	2,211.6	328.6	1,284.7	5,337.9
2003	796.9	681.2	2,217.4	330.7	1,297.8	5,323.9
2004	783.1	663.1	2,220.8	338.5	1,307.1	5,312.6
2005	770.2	647.4	2,221.9	341.7	1,323.1	5,304.3
2006	756.8	638.6	2,213.0	356.6	1,327.0	5,292.0
2007	745.1	630.6	2,206.8	369.6	1,335.0	5,287.1
2008	734.9	624.1	2,194.5	373.2	1,349.1	5,275.8
2009	726.8	617.2	2,176.0	381.8	1,366.1	5,267.9
2010	719.2	613.1	2,145.5	396.8	1,382.8	5,257.4
2011	709.6	601.9	2,124.0	404.4	1,401.9	5,241.8
2012	702.0	589.3	2,107.7	408.0	1,419.0	5,226.0

[a] January 1st. Recalculated on the basis of Population Census 2001.
Source: *KSH*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent02_04

BPDATA

Table 3.1: Labour force participation of the population above 14 years, in thousands[a]

Year	Population of male 15–59 and female 15–54								Population of male above 59 and female above 54			
	Employed	Unemployed	Inactive					Total	Employed	Unemployed	Pensioner, other inactive	Total
			Pensioner	Full time student	On child care leave	Other inactive	Inactive total					
1980	4,887.9	0.0	300.8	370.1	259.0	339.7	1,269.6	6,157.5	570.3	0.0	1,632.1	2,202.4
1990	4,534.3	62.4	284.3	548.9	249.7	297.5	1,380.4	5,977.1	345.7	0.0	1,944.9	2,290.6
1991	4,270.5	253.3	335.6	578.2	259.8	317.1	1,490.7	6,014.5	249.5	0.0	2,045.2	2,294.7
1992	3,898.4	434.9	392.7	620.0	262.1	435.9	1,710.7	6,044.0	184.3	9.8	2,101.7	2,295.8
1993	3,689.5	502.6	437.5	683.9	270.5	480.1	1,872.0	6,064.1	137.5	16.3	2,141.2	2,295.0
1994	3,633.1	437.4	476.5	708.2	280.9	540.7	2,006.3	6,076.8	118.4	11.9	2,163.8	2,294.1
1995	3,571.3	410.0	495.2	723.4	285.3	596.1	2,100.0	6,081.3	107.5	6.4	2,180.6	2,294.5
1996	3,546.1	394.0	512.7	740.0	289.2	599.4	2,141.2	6,081.3	102.1	6.1	2,184.6	2,292.8
1997	3,549.5	342.5	542.9	752.0	289.0	599.9	2,183.8	6,075.8	96.9	6.3	2,189.0	2,292.2
1998	3,608.5	305.5	588.8	697.0	295.5	565.7	2,147.0	6,061.0	89.3	7.5	2,197.6	2,294.4
1999	3,701.0	283.3	534.7	675.6	295.3	549.8	2,055.4	6,039.6	110.4	1.4	2,185.2	2,297.0
2000	3,745.9	261.4	517.9	721.7	281.4	571.4	2,092.4	6,099.7	130.3	2.3	2,268.0	2,400.6
2001	3,742.6	231.7	516.3	717.9	286.6	601.6	2,122.4	6,096.7	140.7	2.4	2,271.8	2,414.9
2002	3,719.6	235.7	507.1	738.3	286.8	593.0	2,125.2	6,080.5	164.1	3.2	2,263.9	2,431.2
2003	3,719.0	239.6	485.0	730.7	286.9	595.0	2,097.6	6,056.2	202.9	4.9	2,245.6	2,453.4
2004	3,663.1	247.2	480.5	739.8	282.4	622.4	2,125.1	6,035.4	237.3	5.7	2,236.1	2,479.1
2005	3,653.9	296.0	449.7	740.8	278.6	590.3	2,059.4	6,009.3	247.6	7.9	2,258.3	2,513.8
2006	3,679.6	308.8	432.9	810.9	270.0	500.7	2,014.5	6,002.9	250.5	8.4	2,268.0	2,526.9
2007	3,676.6	303.7	426.8	832.6	267.2	475.8	2,002.4	5,982.7	249.5	8.2	2,296.1	2,553.8
2008	3,631.4	318.5	408.6	819.6	279.8	493.1	2,001.1	5,951.0	248.1	10.7	2,327.7	2,586.5
2009	3,516.8	406.4	364.5	814.6	278.7	529.3	1,987.1	5,910.3	265.1	14.3	2,348.0	2,627.4
2010	3,485.7	455.2	338.7	814.6	267.0	500.7	1,921.0	5,861.9	295.5	19.6	2,356.0	2,671.1
2011	3,484.2	444.1	290.7	794.4	280.5	519.0	1,884.6	5,813.0	327.7	23.8	2,357.6	2,709.1

[a] Annual average figures.

Note: Up to 1999 the weighted figures are based on the 1990 population census, since 2000 the data is updated based on the 2001 population census. Data on 'employed' includes conscripts and those working while receiving pension or child support. The data on students for 1995–97 are estimates. 'Other inactive' is a residual category, so it includes the institutional population not observed by MEF.

Source: Pensioners: 1980–91: *NYUFIG,* 1992–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990–91: *NFSZ REG,* 1992–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent03_01

Table 3.2: Labour force participation of the population above 14 years, males, in thousands[a]

BPDATA

Year	Population of male 15–59								Population of male 60 and above			
			Inactive									
	Employed	Unemployed	Pensioner	Full time student	On child care leave	Other inactive	Inactive total	Total	Employed	Unemployed	Pensioner, other inactive	Total
1980	2,750.5	0.0	173.8	196.3	0.0	99.1	469.2	3,219.7	265.3	0.0	491.8	757.1
1990	2,524.3	37.9	188.4	284.2	1.2	80.3	554.1	3,116.3	123.7	0.0	665.5	789.2
1991	2,351.6	150.3	218.7	296.5	1.5	115.0	631.7	3,133.6	90.4	0.0	700.7	791.1
1992	2,153.1	263.2	252.0	302.4	1.7	174.8	730.9	3,147.2	65.1	3.2	722.1	790.4
1993	2,029.1	311.5	263.2	346.9	2.0	203.3	815.4	3,156.0	47.9	4.5	735.7	788.1
1994	2,013.4	270.0	277.6	357.1	3.7	239.6	878.0	3,161.4	41.6	3.8	740.0	785.4
1995	2,012.5	259.3	282.2	367.4	4.9	237.8	892.3	3,164.1	37.1	2.1	742.6	781.8
1996	2,007.4	242.4	291.9	372.8	3.3	248.3	916.3	3,166.1	28.9	1.3	746.3	776.5
1997	2,018.0	212.2	306.0	377.6	1.5	251.6	936.7	3,166.9	25.5	1.9	743.5	770.9
1998	2,015.5	186.5	345.4	350.4	1.0	264.2	961.0	3,163.0	26.2	2.8	737.3	766.3
1999	2,068.4	170.3	312.7	338.8	4.2	261.5	917.2	3,155.9	34.7	0.4	727.2	762.3
2000	2,086.0	158.2	315.2	358.2	4.1	261.7	939.2	3,183.4	39.8	0.7	758.8	799.3
2001	2,087.6	141.6	311.0	353.4	4.3	283.2	951.9	3,181.1	41.1	0.9	763.0	805.0
2002	2,080.4	137.3	307.5	370.3	5.0	273.4	956.2	3,173.9	45.2	0.7	764.4	810.3
2003	2,073.5	137.6	293.6	367.9	4.3	288.1	953.9	3,165.0	53.0	0.9	762.5	816.4
2004	2,052.7	136.2	293.5	371.2	4.6	300.2	969.5	3,158.4	64.6	0.6	758.8	824.0
2005	2,050.7	158.2	278.8	375.4	5.8	288.8	948.8	3,157.7	65.4	0.9	763.9	830.2
2006	2,076.5	163.6	268.1	404.1	7.0	239.3	918.5	3,158.4	60.5	1.0	770.9	832.8
2007	2,082.6	163.2	267.7	412.3	3.8	225.2	909.0	3,154.8	60.4	1.0	779.0	840.4
2008	2,052.0	173.4	266.3	408.2	4.8	240.4	919.7	3,145.1	58.8	0.9	791.7	851.4
2009	1,983.6	232.3	241.8	410.8	4.6	261.6	918.8	3,134.4	61.6	1.3	800.7	863.6
2010	1,960.1	262.5	228.3	410.2	4.6	254.0	897.1	3,119.7	62.6	1.9	813.6	878.1
2011	1,987.3	250.4	198.8	399.6	3.8	261.6	863.8	3,101.6	70.0	2.9	819.6	892.5

[a] Annual average figures.

Note: Up to 1999 the weighted figures are based on the 1990 population census, since 2000 the data is updated based on the 2001 population census. Data on 'employed' includes conscripts and those working while receiving pension or child support. The data on students for 1995–97 are estimates. 'Other inactive' is a residual category, so it includes the institutional population not observed by MEF.

Source: Pensioners: 1980–91: *NYUFIG,* 1992–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990–91: *NFSZ REG,* 1992–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent03_02

BPDATA

Table 3.3: Labour force participation of the population above 14 years, females, in thousands[a]

Year	Population of female 15–54								Population of female 55 and above			
			Inactive									
	Employed	Unemployed	Pensioner	Full time student	On child care leave	Other inactive	Inactive total	Total	Employed	Unemployed	Pensioner, other inactive	Total
1980	2,137.4	0.0	127.0	173.8	259.0	240.6	800.4	2,937.8	305.0	0.0	1,140.3	1,445.3
1990	2,010.0	24.5	95.8	264.7	248.5	217.3	826.3	2,860.8	222.0	0.0	1,279.4	1,501.4
1991	1,918.9	103.1	116.9	281.8	258.3	201.9	858.9	2,880.9	159.1	0.0	1,344.5	1,503.6
1992	1,745.3	171.7	140.8	317.6	260.4	261.1	979.9	2,896.9	119.2	6.6	1,379.6	1,505.4
1993	1,660.4	191.1	174.3	337.0	268.5	276.8	1,056.6	2,908.1	89.6	11.8	1,405.5	1,506.9
1994	1,619.7	167.4	198.9	351.1	277.2	301.1	1,128.3	2,915.4	76.8	8.1	1,423.8	1,508.7
1995	1,558.8	150.7	213.0	356.0	280.4	358.3	1,207.7	2,917.2	70.4	4.3	1,438.0	1,512.7
1996	1,538.7	151.6	220.7	367.2	285.9	351.1	1,224.9	2,915.2	73.2	4.8	1,438.3	1,516.3
1997	1,531.5	130.3	236.9	374.4	287.5	348.3	1,247.1	2,908.9	71.4	4.4	1,445.3	1,521.1
1998	1,593.0	119.0	243.4	346.6	294.5	301.5	1,186.0	2,898.0	63.1	4.7	1,460.3	1,528.1
1999	1,632.6	113.0	222.0	336.8	291.1	288.3	1,138.2	2,883.8	75.8	1.0	1,458.0	1,534.8
2000	1,659.9	103.2	202.7	363.5	277.3	309.7	1,153.2	2,916.3	90.5	1.6	1,509.2	1,601.3
2001	1,655.0	90.1	205.3	364.5	282.3	318.3	1,170.4	2,915.5	99.6	1.5	1,508.8	1,609.9
2002	1,639.2	98.4	199.6	368.0	281.8	319.6	1,169.0	2,906.6	118.9	2.5	1,499.5	1,620.9
2003	1,645.6	102.0	191.4	362.8	282.6	306.9	1,143.7	2,891.2	149.9	4.0	1,483.2	1,637.1
2004	1,610.2	111.0	186.8	368.6	277.8	322.2	1,155.4	2,876.6	172.8	5.1	1,477.3	1,655.2
2005	1,603.2	137.8	170.9	365.4	272.8	301.5	1,110.6	2,851.6	182.2	7.0	1,494.4	1,683.6
2006	1,603.1	144.8	164.8	406.8	263.0	262.0	1,096.6	2,844.5	189.6	7.4	1,497.1	1,694.1
2007	1,594.0	140.5	159.1	420.3	263.4	250.6	1,093.4	2,827.9	189.1	7.2	1,517.1	1,713.4
2008	1,579.4	145.1	142.3	411.4	276.0	252.7	1,082.4	2,806.9	189.3	9.8	1,536.0	1,735.1
2009	1,533.5	174.1	122.7	403.8	274.1	267.7	1,068.3	2,775.9	203.5	13.0	1,547.3	1,763.8
2010	1,525.6	192.8	110.4	404.4	262.4	246.6	1,023.8	2,742.2	233.0	17.7	1,542.3	1,793.0
2011	1,496.9	193.7	91.9	394.8	276.7	257.4	1,020.8	2,711.4	257.7	20.9	1,538.0	1,816.6

[a] Annual average figures.

Note: Up to 1999 the weighted figures are based on the 1990 population census, since 2000 the data is updated based on the 2001 population census. Data on 'employed' includes conscripts and those working while receiving pension or child support. The data on students for 1995–97 are estimates. 'Other inactive' is a residual category, so it includes the institutional population not observed by MEF.

Source: Pensioners: 1980–91: *NYUFIG,* 1992–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990–91: *NFSZ REG,* 1992–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent03_03

Table 3.4: Labour force participation of the population above 14 years, per cent

BPDATA

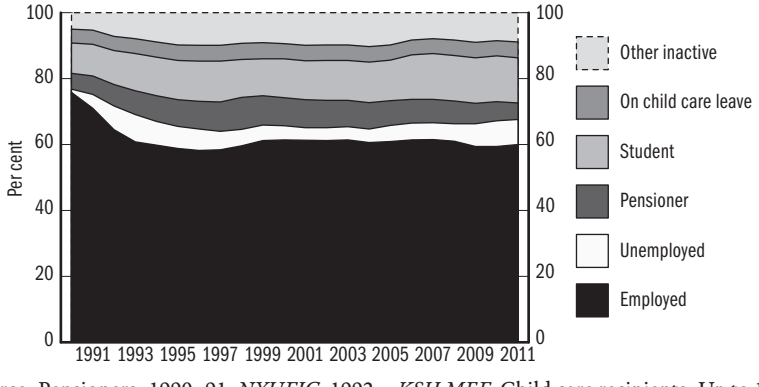
Year	Population of male 15–59 and female 15–54								Population of male above 59 and female above 54			
			Inactive									
	Employed	Unemployed	Pensioner	Full time student	On child care leave	Other inactive	Inactive total	Total	Employed	Unemployed	Pensioner, other inactive	Total
1980	79.4	0.0	4.9	6.0	4.2	5.5	20.6	100.0	25.9	0.0	74.1	100.0
1990	75.9	1.0	4.8	9.2	4.2	5.0	23.1	100.0	15.1	0.0	84.9	100.0
1995	58.7	6.7	8.1	11.9	4.7	9.8	34.5	100.0	4.7	0.3	95.0	100.0
1996	58.3	6.5	8.4	12.2	4.8	9.9	35.2	100.0	4.5	0.3	95.3	100.0
1997	58.4	5.6	8.9	12.4	4.8	9.9	35.9	100.0	4.2	0.3	95.5	100.0
1998	59.5	5.0	9.7	11.5	4.9	9.3	35.4	100.0	3.9	0.3	95.8	100.0
1999	61.3	4.7	8.9	11.2	4.9	9.1	34.0	100.0	4.8	0.1	95.1	100.0
2000	61.4	4.3	8.5	11.8	4.6	9.4	34.3	100.0	5.4	0.1	94.5	100.0
2001	61.4	3.8	8.5	11.8	4.7	9.9	34.8	100.0	5.8	0.1	94.1	100.0
2002	61.2	3.9	8.3	12.1	4.7	9.8	35.0	100.0	6.7	0.1	93.1	100.0
2003	61.4	4.0	8.0	12.1	4.7	9.8	34.6	100.0	8.3	0.2	91.5	100.0
2004	60.7	4.1	8.0	12.3	4.7	10.3	35.2	100.0	9.6	0.2	90.2	100.0
2005	60.8	4.9	7.5	12.3	4.6	9.8	34.3	100.0	9.8	0.3	89.8	100.0
2006	61.3	5.1	7.2	13.5	4.5	8.3	33.6	100.0	9.9	0.3	89.8	100.0
2007	61.5	5.1	7.1	13.9	4.5	7.9	33.5	100.0	9.8	0.3	89.9	100.0
2008	61.0	5.3	6.9	13.8	4.7	8.3	33.6	100.0	9.6	0.4	90.0	100.0
2009	59.5	6.9	6.2	13.8	4.7	9.0	33.6	100.0	10.1	0.5	89.4	100.0
2010	59.5	7.8	5.8	13.9	4.6	8.5	32.8	100.0	11.1	0.7	88.2	100.0
2011	59.9	7.6	5.0	13.7	4.8	8.9	32.4	100.0	12.1	0.9	87.0	100.0

Source: Pensioners: 1980–90: *NYUFIG,* 1995–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990: *NFSZ REG,* 1995–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent03_04

Figure 3.1: Labour force participation of population at male 15–59 and female 15–54, total

BPDATA



Source: Pensioners: 1990–91: *NYUFIG,* 1992–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990-91: *NFSZ REG,* 1992–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena03_01

BPDATA

Table 3.5: Labour force participation of the population above 14 years, males, per cent

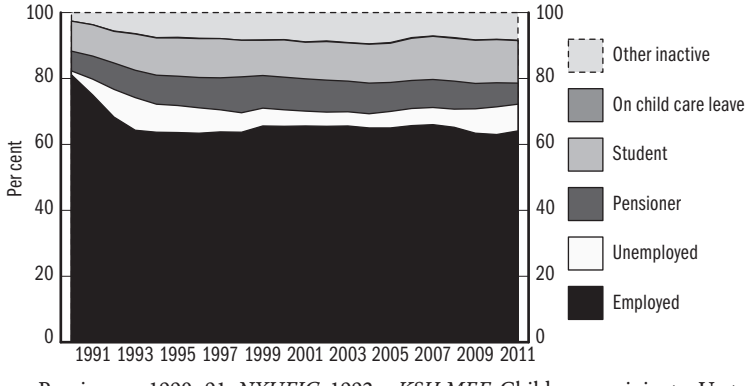
Year	Population of male 15–59								Population of male 60 and above			
	Employed	Unemployed	Inactive					Total	Employed	Unemployed	Pensioner, other inactive	Total
			Pensioner	Full time student	On child care leave	Other inactive	Inactive total					
1980	85.4	0.0	5.4	6.1	0.0	3.1	14.6	100.0	35.0	0.0	65.0	100.0
1990	81.0	1.2	6.0	9.1	0.0	2.6	17.8	100.0	15.7	0.0	84.3	100.0
1995	63.6	8.2	8.9	11.6	0.2	7.5	28.2	100.0	4.7	0.3	95.0	100.0
1996	63.4	7.7	9.2	11.8	0.1	7.8	28.9	100.0	3.7	0.2	96.1	100.0
1997	63.7	6.7	9.7	11.9	0.0	7.9	29.6	100.0	3.3	0.2	96.4	100.0
1998	63.7	5.9	10.9	11.1	0.0	8.4	30.4	100.0	3.4	0.4	96.2	100.0
1999	65.5	5.4	9.9	10.7	0.1	8.3	29.1	100.0	4.6	0.1	95.4	100.0
2000	65.5	5.0	9.9	11.3	0.1	8.2	29.5	100.0	5.0	0.1	94.9	100.0
2001	65.6	4.5	9.8	11.1	0.1	8.9	29.9	100.0	5.1	0.1	94.8	100.0
2002	65.5	4.3	9.7	11.7	0.2	8.6	30.1	100.0	5.6	0.1	94.3	100.0
2003	65.5	4.3	9.3	11.6	0.1	9.1	30.1	100.0	6.5	0.1	93.4	100.0
2004	65.0	4.3	9.3	11.8	0.1	9.5	30.7	100.0	7.8	0.1	92.1	100.0
2005	64.9	5.0	8.8	11.9	0.2	9.1	30.0	100.0	7.9	0.1	92.0	100.0
2006	65.7	5.2	8.5	12.8	0.2	7.6	29.1	100.0	7.3	0.1	92.6	100.0
2007	66.0	5.2	8.5	13.1	0.1	7.1	28.8	100.0	7.2	0.1	92.7	100.0
2008	65.2	5.5	8.5	13.0	0.2	7.6	29.2	100.0	6.9	0.1	93.0	100.0
2009	63.3	7.4	7.7	13.1	0.1	8.3	29.3	100.0	7.1	0.2	92.7	100.0
2010	62.8	8.4	7.3	13.1	0.1	8.1	28.8	100.0	7.1	0.2	92.7	100.0
2011	64.1	8.1	6.4	12.9	0.1	8.4	27.9	100.0	7.8	0.3	91.8	100.0

Source: Pensioners: 1980–90: *NYUFIG,* 1995–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990: *NFSZ REG,* 1995–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent03_05

BPDATA

Figure 3.2: Labour force participation of population at male 15–59



Source: Pensioners: 1990–91: *NYUFIG,* 1992–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990-91: *NFSZ REG,* 1992–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena03_02

Table 3.6: Labour force participation of the population above 14 years, females, per cent

BPDATA

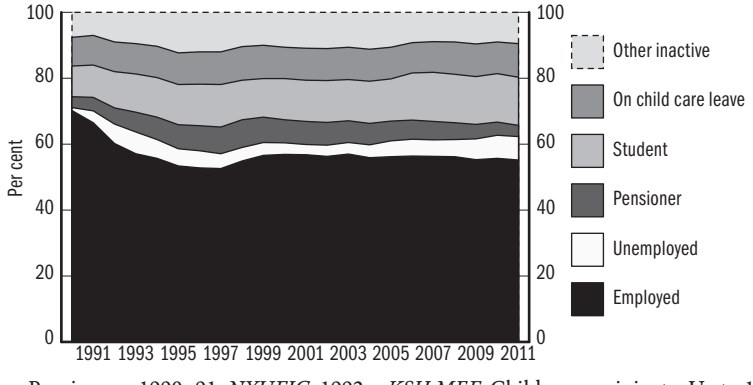
Year	Population of female 15–54								Population of female 55 and above			
			Inactive									
	Employed	Unemployed	Pensioner	Full time student	On child care leave	Other inactive	Inactive total	Total	Employed	Unemployed	Pensioner, other inactive	Total
1980	72.8	0.0	4.3	5.9	8.8	8.2	27.2	100.0	21.1	0.0	78.9	100.0
1990	70.3	0.9	3.3	9.3	8.7	7.6	28.9	100.0	14.8	0.0	85.2	100.0
1995	53.4	5.2	7.3	12.2	9.6	12.3	41.4	100.0	4.7	0.3	95.1	100.0
1996	52.8	5.2	7.6	12.6	9.8	12.0	42.0	100.0	4.8	0.3	94.9	100.0
1997	52.6	4.5	8.1	12.9	9.9	12.0	42.9	100.0	4.7	0.3	95.0	100.0
1998	55.0	4.1	8.4	12.0	10.2	10.4	40.9	100.0	4.1	0.3	95.6	100.0
1999	56.6	3.9	7.7	11.7	10.1	10.0	39.5	100.0	4.9	0.1	95.0	100.0
2000	56.9	3.5	7.0	12.5	9.5	10.6	39.5	100.0	5.7	0.1	94.2	100.0
2001	56.8	3.1	7.0	12.5	9.7	10.9	40.1	100.0	6.2	0.1	93.7	100.0
2002	56.4	3.4	6.9	12.7	9.7	11.0	40.2	100.0	7.3	0.2	92.5	100.0
2003	56.9	3.5	6.6	12.5	9.8	10.6	39.6	100.0	9.2	0.2	90.6	100.0
2004	56.0	3.9	6.5	12.8	9.7	11.2	40.2	100.0	10.4	0.3	89.3	100.0
2005	56.2	4.8	6.0	12.8	9.6	10.6	38.9	100.0	10.8	0.4	88.8	100.0
2006	56.4	5.1	5.8	14.3	9.2	9.2	38.6	100.0	11.2	0.4	88.4	100.0
2007	56.4	5.0	5.6	14.9	9.3	8.9	38.7	100.0	11.0	0.4	88.6	100.0
2008	56.3	5.2	5.1	14.7	9.8	9.0	38.6	100.0	10.9	0.6	88.5	100.0
2009	55.2	6.3	4.4	14.5	9.9	9.6	38.5	100.0	11.5	0.8	87.7	100.0
2010	55.6	7.0	4.0	14.7	9.6	9.0	37.5	100.0	13.0	1.0	86.0	100.0
2011	55.2	7.1	3.4	14.6	10.2	9.5	37.6	100.0	14.2	1.2	84.7	100.0

Source: Pensioners: 1980–90: *NYUFIG,* 1995–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990: *NFSZ REG,* 1995–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent03_06

BPDATA

Figure 3.3: Labour force participation of population at female 15–54



Source: Pensioners: 1990–91: *NYUFIG,* 1992–: *KSH MEF*. Child care recipients: Up to 1997 *TB* and estimation, after 1997 *MEF*. Unemployment: 1990-91: *NFSZ REG,* 1992–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena03_03

BPDATA

Table 3.7: Population aged 15–64 by labour market status (self-categorised), in thousands

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Together												
In work	3,778.9	3,827.4	3,827.1	3,843.6	3,834.4	3,852.2	3,864.1	3,857.2	3,800.7	3,715.3	3,709.8	3,746.7
Unemployed	448.1	414.5	410.4	431.8	451.0	488.2	468.1	448.3	481.4	592.5	676.0	678.7
Student, pupils	749.9	739.9	763.1	767.7	783.8	792.0	847.8	870.4	868.9	864.5	861.8	848.3
Pensioner	991.8	990.8	940.4	856.4	800.3	755.6	617.8	568.6	611.0	600.9	579.3	570.3
Disabled	223.8	251.0	284.4	338.3	370.4	359.7	520.4	560.3	530.0	495.5	482.1	448.4
On child care leave	272.4	272.3	278.3	281.7	274.7	272.4	273.5	279.7	292.4	290.5	280.5	288.3
Dependent	165.9	170.7	160.4	135.1	133.3	134.6	116.1	111.9	106.2	105.6	100.4	110.5
Out of work for other reason	133.6	184.7	185.7	181.7	178.4	160.0	108.0	103.3	103.6	106.4	79.3	83.8
Total	6,764.4	6,851.3	6,849.8	6,836.3	6,826.3	6,814.7	6,815.8	6,799.7	6,794.2	6,771.2	6,769.2	6,775.0
Males												
In work	2,075.4	2,089.5	2,090.2	2,087.3	2,082.8	2,088.3	2,105.0	2,108.9	2,074.0	2,013.1	1,989.1	2,026.4
Unemployed	270.4	255.2	239.3	244.2	247.7	265.2	251.6	241.9	257.5	334.2	376.5	373.4
Student, pupils	371.4	363.6	380.9	383.7	391.1	398.5	418.9	430.2	431.5	432.9	431.2	425.5
Pensioner	388.6	386.3	368.1	337.4	322.5	304.5	236.0	205.2	233.8	235.1	240.4	243.4
Disabled	120.4	134.2	148.1	169.9	184.5	178.7	250.4	269.9	259.4	237.1	231.0	212.7
On child care leave	3.8	4.0	4.9	4.7	4.9	6.1	5.5	4.1	5.8	6.0	6.7	4.7
Dependent	5.3	6.3	5.1	5.3	6.0	7.0	5.8	6.6	7.2	7.3	10.3	10.0
Out of work for other reason	77.6	100.8	101.2	97.5	89.6	80.1	54.9	52.1	52.1	50.1	36.1	37.5
Total	3,312.9	3,339.9	3,337.8	3,330.0	3,329.1	3,328.4	3,328.1	3,318.9	3,321.3	3,315.8	3,321.3	3,333.6
Females												
In work	1,703.5	1,737.9	1,736.9	1,756.3	1,751.6	1,763.9	1,759.1	1,748.3	1,726.6	1,702.2	1,720.7	1,720.4
Unemployed	177.7	159.3	171.1	187.6	203.3	223.0	216.5	206.4	223.8	258.3	299.5	305.4
Student, pupils	378.5	376.3	382.2	384.0	392.7	393.5	428.9	440.2	437.4	431.6	430.6	422.8
Pensioner	603.2	604.5	572.3	519.0	477.8	451.1	381.8	363.4	377.2	365.7	338.9	326.9
Disabled	103.4	116.8	136.3	168.4	185.9	181.0	270.0	290.4	270.6	258.4	251.1	235.7
On child care leave	268.6	268.3	273.4	277.0	269.8	266.3	268.0	275.6	286.7	284.5	273.9	283.6
Dependent	160.6	164.4	155.3	129.8	127.3	127.6	110.3	105.3	99.1	98.3	90.1	100.4
Out of work for other reason	56.0	83.9	84.5	84.2	88.8	79.9	53.1	51.2	51.4	56.3	43.1	46.3
Total	3,451.5	3,511.4	3,512.0	3,506.3	3,497.2	3,486.3	3,487.7	3,480.8	3,472.8	3,455.3	3,447.9	3,441.5

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent03_07

Table 3.8: Population aged 15–64 by labour market status (self-categorised), per cent

BPDATA

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Together													
In work	54.7	55.9	55.9	55.9	56.2	56.2	56.5	56.7	56.7	55.9	54.9	54.8	55.3
Unemployed	7.0	6.6	6.0	6.0	6.3	6.6	7.2	6.9	6.6	7.1	8.8	10.0	10.0
Student, pupils	11.1	11.1	10.8	11.1	11.2	11.5	11.6	12.4	12.8	12.8	12.8	12.7	12.5
Pensioner	15.9	14.7	14.5	13.7	12.5	11.7	11.1	9.1	8.4	9.0	8.9	8.6	8.4
Disabled	2.9	3.3	3.7	4.2	4.9	5.4	5.3	7.6	8.2	7.8	7.3	7.1	6.6
On child care leave	4.3	4.0	4.0	4.1	4.1	4.0	4.0	4.0	4.1	4.3	4.3	4.1	4.3
Dependent	2.5	2.5	2.5	2.3	2.0	2.0	2.0	1.7	1.6	1.6	1.6	1.5	1.6
Out of work for other reason	1.7	2.0	2.7	2.7	2.7	2.6	2.3	1.6	1.5	1.5	1.6	1.2	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males													
In work	61.6	62.6	62.6	62.6	62.7	62.6	62.7	63.2	63.5	62.4	60.7	59.9	60.8
Unemployed	8.6	8.2	7.6	7.2	7.3	7.4	8.0	7.6	7.3	7.8	10.1	11.3	11.2
Student, pupils	11.3	11.2	10.9	11.4	11.5	11.7	12.0	12.6	13.0	13.0	13.1	13.0	12.8
Pensioner	12.9	11.7	11.6	11.0	10.1	9.7	9.1	7.1	6.2	7.0	7.1	7.2	7.3
Disabled	3.2	3.6	4.0	4.4	5.1	5.5	5.4	7.5	8.1	7.8	7.2	7.0	6.4
On child care leave	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.1
Dependent	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Out of work for other reason	2.0	2.3	3.0	3.0	2.9	2.7	2.4	1.6	1.6	1.6	1.5	1.1	1.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Females													
In work	48.1	49.4	49.5	49.5	50.1	50.1	50.6	50.4	50.2	49.7	49.3	49.9	50.0
Unemployed	5.4	5.1	4.5	4.9	5.4	5.8	6.4	6.2	5.9	6.4	7.5	8.7	8.9
Student, pupils	10.9	11.0	10.7	10.9	11.0	11.2	11.3	12.3	12.6	12.6	12.5	12.5	12.3
Pensioner	18.8	17.5	17.2	16.3	14.8	13.7	12.9	10.9	10.4	10.9	10.6	9.8	9.5
Disabled	2.6	3.0	3.3	3.9	4.8	5.3	5.2	7.7	8.3	7.8	7.5	7.3	6.8
On child care leave	8.2	7.8	7.6	7.8	7.9	7.7	7.6	7.7	7.9	8.3	8.2	7.9	8.2
Dependent	4.6	4.7	4.7	4.4	3.7	3.6	3.7	3.2	3.0	2.9	2.8	2.6	2.9
Out of work for other reason	1.3	1.6	2.4	2.4	2.4	2.5	2.3	1.5	1.5	1.5	1.6	1.3	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent03_08

BPDATA

Table 4.1: Employment

Year	In thousands	1992 = 100	Annual changes	Employment ratio[a]
1980	5,458.2	133.7	..	65.3
1990	4,880.0	119.5	..	59.0
1991	4,520.0	110.7	–7.4	54.4
1992	4,082.7	100.0	–9.7	49.0
1993	3,827.0	93.7	–6.3	45.8
1994	3,751.5	91.9	–2.0	44.8
1995	3,678.8	90.1	–1.9	43.9
1996	3,648.2	89.4	–0.8	43.6
1997	3,646.4	89.3	0.0	43.6
1998	3,697.8	90.6	1.4	44.3
1999	3,811.4	93.4	3.1	45.7
2000	3,849.1	94.3	1.0	46.2
2001	3,883.3	95.1	0.3	45.6
2002	3,883.7	95.1	0.0	45.6
2003	3,921.9	96.1	1.2	46.2
2004	3,900.4	95.5	–0.5	45.8
2005	3,901.5	95.6	0.0	45.7
2006	3,930.1	96.3	0.7	46.0
2007	3,926.2	96.2	0.0	46.0
2008	3,879.4	95.0	–1.2	45.4
2009	3,781.9	92.6	–2.4	44.3
2010	3,781.2	92.6	0.0	44.3
2011	3,811.9	93.4	1.0	44.7

[a] Per cent of the population above 14 year.
Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: 1980–91: *KSH MEM,* 1992–: *KSH MEF.*

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_01

BPDATA

Figure 4.1: Employed

Source: 1990-91: *KSH MEM*, 1992–: *KSH MEF.*

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena04_01

Table 4.2: Employment by gender

BPDATA

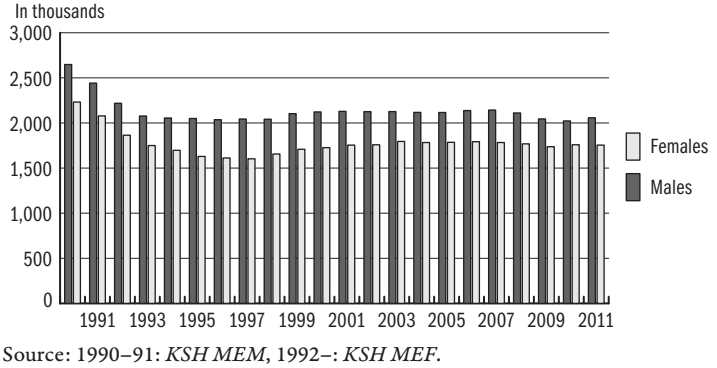
Year	Males		Females		Share of females (%)
	In thousands	1992 = 100	In thousands	1992 = 100	
1980	3,015.8	136.0	2,442.4	131.0	44.7
1990	2,648.0	119.4	2,232.0	119.7	45.7
1991	2,442.0	110.1	2,078.0	111.5	46.0
1992	2,218.2	100.0	1,864.5	100.0	45.7
1993	2,077.0	93.6	1,750.0	93.9	45.7
1994	2,055.0	92.6	1,696.5	91.0	45.2
1995	2,049.6	92.4	1,629.2	87.4	44.3
1996	2,036.3	91.8	1,611.9	86.5	44.2
1997	2,043.5	92.1	1,602.9	86.0	44.0
1998	2,041.7	92.0	1,656.1	88.8	44.8
1999	2,103.1	94.8	1,708.4	91.6	44.8
2000	2,122.4	95.7	1,726.7	92.6	44.9
2001	2,128.7	96.0	1,754.6	94.1	45.2
2002	2,125.6	95.8	1,758.1	94.3	45.3
2003	2,126.5	95.6	1,795.4	96.2	45.8
2004	2,117.3	95.5	1,783.1	95.6	45.7
2005	2,116.1	95.4	1,785.4	95.8	45.8
2006	2,137.4	96.4	1,792.7	96.1	45.6
2007	2,143.0	96.6	1,783.2	95.6	45.5
2008	2,110.8	95.2	1,768.6	94.9	45.6
2009	2,044.9	92.2	1,737.0	93.2	45.9
2010	2,022.6	91.2	1,758.6	94.4	46.5
2011	2,057.3	92.7	1,754.6	94.1	46.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: 1980–91: *KSH MEM*, 1992–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_02

Figure 4.2: Employment by gender

BPDATA



Source: 1990–91: *KSH MEM*, 1992–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena04_02

BPDATA

Table 4.3: Composition of the employed by age groups, males, per cent

Year	15–19	20–24	25–49	50–54	55–59	60+	Total
	years old						
1980	5.1	12.6	55.4	10.2	8.0	8.7	100.0
1990	5.0	10.8	64.1	8.6	6.8	4.7	100.0
1998	2.3	13.4	67.6	10.3	5.1	1.3	100.0
1999	1.9	13.2	67.1	10.5	5.6	1.6	100.0
2000	1.5	12.4	67.3	10.6	6.4	1.8	100.0
2001	1.2	10.4	68.6	11.1	6.7	2.0	100.0
2002	0.9	9.4	69.4	11.3	6.9	2.1	100.0
2003	0.7	8.6	69.1	11.8	7.3	2.5	100.0
2004	0.7	7.4	69.5	12.0	7.3	3.0	100.0
2005	0.6	6.8	68.9	12.7	7.9	3.1	100.0
2006	0.6	6.6	68.5	13.0	8.4	2.9	100.0
2007	0.5	6.5	68.7	13.0	8.5	2.8	100.0
2008	0.5	6.3	69.0	13.1	8.3	2.8	100.0
2009	0.4	5.6	69.6	12.2	9.2	3.0	100.0
2010	0.3	5.7	69.3	12.0	9.6	3.1	100.0
2011	0.3	5.5	69.5	11.5	9.7	3.4	100.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: 1980–90: Census based estimates. 1998–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_03

BPDATA

Table 4.4: Composition of the employed by age groups, females, per cent

Year	15–19	20–24	25–49	50–54	55+	Total
	years old					
1980	5.3	9.7	61.8	10.7	12.5	100.0
1990	5.2	8.6	66.2	10.0	10.0	100.0
1998	2.3	12.2	71.2	10.5	3.8	100.0
1999	1.7	12.1	70.2	11.6	4.4	100.0
2000	1.4	11.1	69.6	12.7	5.2	100.0
2001	1.1	9.6	70.5	13.1	5.7	100.0
2002	0.8	9.2	69.4	13.8	6.8	100.0
2003	0.5	8.2	68.8	14.0	8.5	100.0
2004	0.5	7.1	68.2	14.6	9.7	100.0
2005	0.4	6.4	67.6	15.4	10.2	100.0
2006	0.4	6.1	66.8	16.2	10.6	100.0
2007	0.3	5.8	67.3	16.0	10.6	100.0
2008	0.3	5.5	67.4	16.1	10.7	100.0
2009	0.3	5.4	67.2	15.4	11.7	100.0
2010	0.3	5.3	66.3	14.8	13.2	100.0
2011	0.3	5.4	66.0	13.8	14.5	100.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: 1980–90: Census based estimates. 1998–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_04

Table 4.5: Composition of the employed by level of education, males, per cent

BPDATA

Year	8 grades of primary school or less	Vocational school	Secondary school	College, university	Total
1980	40.8	32.3	18.2	8.7	100.0
1990	37.6	30.5	20.1	11.8	100.0
1998	20.3	39.4	25.7	14.7	100.0
1999	16.8	41.5	26.8	14.9	100.0
2000	16.1	41.6	26.7	15.6	100.0
2001	15.6	42.8	26.0	15.6	100.0
2002	14.6	43.2	26.4	15.8	100.0
2003	14.0	41.3	27.7	17.0	100.0
2004	13.0	40.4	28.0	18.6	100.0
2005	13.0	40.8	27.7	18.5	100.0
2006	12.3	40.8	28.3	18.6	100.0
2007	11.8	40.8	28.7	18.7	100.0
2008	11.7	39.4	29.0	19.8	100.0
2009	10.9	38.6	30.1	20.3	100.0
2010	10.7	38.2	30.6	20.5	100.0
2011	10.6	37.1	30.4	21.9	100.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. Since 1999, slight changes have occurred in the categorisation system by highest education level.
Source: 1980–90: Census based estimates. 1998–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_05

Table 4.6: Composition of the employed by level of education, females, per cent

BPDATA

Year	8 grades of primary school or less	Vocational school	Secondary school	College, university	Total
1980	53.1	12.3	27.5	7.2	100.0
1990	43.4	13.4	31.4	11.8	100.0
1998	23.6	20.2	38.2	18.0	100.0
1999	20.6	20.3	40.6	18.5	100.0
2000	19.1	20.9	40.8	19.2	100.0
2001	19.1	21.3	40.3	19.3	100.0
2002	18.5	21.5	40.2	19.8	100.0
2003	16.4	21.5	40.9	21.2	100.0
2004	15.9	20.5	40.2	23.4	100.0
2005	15.4	20.2	40.0	24.4	100.0
2006	14.3	20.7	40.1	24.9	100.0
2007	13.6	21.2	40.1	25.1	100.0
2008	13.3	20.3	39.3	27.1	100.0
2009	12.5	19.9	39.2	28.4	100.0
2010	12.4	20.2	38.7	28.7	100.0
2011	11.5	20.0	38.3	30.1	100.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. Since 1999, slight changes have occurred in the categorisation system by highest education level.
Source: 1980–90: Census based estimates. 1998–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_06

BPDATA

Table 4.7: Employed by employment status, in thousands

Year	Employees	Member of cooperatives	Member of other partnerships	Self-employed and assisting family members	Total
1996	2,961.2	79.0	151.8	413.1	3,605.1
1997	2,989.7	68.9	137.4	414.3	3,610.3
1998	3,088.5	55.8	132.5	397.9	3,674.7
1999	3,201.3	42.5	111.8	435.9	3,791.5
2000	3,255.5	37.1	129.4	407.1	3,829.1
2001	3,313.6	31.4	118.9	404.4	3,868.3
2002	3,337.2	22.5	109.9	401.0	3,870.6
2003	3,399.2	8.6	114.7	399.4	3,921.9
2004	3,347.8	8.1	136.6	407.8	3,900.3
2005	3,367.3	5.8	146.7	381.7	3,901.5
2006	3,431.4	4.8	126.7	367.2	3,930.1
2007	3,439.7	4.4	123.2	358.9	3,926.2
2008	3,405.1	2.3	122.5	349.5	3,879.4
2009	3,309.9	2.0	136.8	333.2	3,781.9
2010	3,317.5	3.0	140.0	320.7	3,781.2
2011	3,352.4	1.9	134.3	323.3	3,811.9

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. Conscripts are excluded.
Source: 1996–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_07

BPDATA

Table 4.8: Composition of the employed persons by employment status, per cent

Year	Employees	Member of cooperatives	Member of other partnerships	Self-employed and assisting family members	Total
1996	82.1	2.2	4.2	11.5	100.0
1997	82.8	1.9	3.8	11.5	100.0
1998	84.0	1.5	3.6	10.8	100.0
1999	84.4	1.1	2.9	11.5	100.0
2000	85.0	1.0	3.4	10.6	100.0
2001	85.7	0.8	3.1	10.5	100.0
2002	86.2	0.6	2.8	10.4	100.0
2003	86.7	0.2	2.8	10.3	100.0
2004	85.8	0.2	3.5	10.5	100.0
2005	86.3	0.1	3.8	9.8	100.0
2006	87.3	0.1	3.2	9.4	100.0
2007	87.6	0.1	3.1	9.2	100.0
2008	87.7	0.1	3.2	9.0	100.0
2009	87.5	0.1	3.6	8.8	100.0
2010	87.7	0.1	3.7	8.5	100.0
2011	87.9	0.0	3.5	8.5	100.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. Conscripts are excluded.
Source: 1996–: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_08

Table 4.9: Composition of employed persons by sector[a], by gender, per cent

BPDATA

	2009			2010			2011		
	Males	Females	Together	Males	Females	Together	Males	Females	Together
Agriculture, forestry and fishing	5.0	1.8	3.5	5.0	1.6	3.4	5.6	2.0	3.8
Mining and quarrying	0.4	0.0	0.2	0.6	0.1	0.4	0.5	0.1	0.3
Manufacturing	26.8	18.3	22.7	26.1	18.3	22.3	27.0	18.6	23.0
Electricity, gas, steam and air conditioning supply	1.7	0.6	1.2	1.5	0.7	1.1	1.6	0.6	1.1
Water supply; sewerage, waste management and remediation activities	2.0	0.6	1.3	2.3	0.6	1.4	2.2	0.8	1.5
Construction	12.3	1.2	7.0	11.7	1.2	6.6	11.0	0.9	6.2
Wholesale and retail trade; repair of motor vehicles and motorcycles	11.4	15.9	13.6	11.4	16.1	13.6	11.5	15.8	13.6
Transportation and storage	9.6	4.1	6.9	10.1	3.8	7.1	9.5	4.1	6.9
Accommodation and food service activities	3.1	4.8	3.9	3.2	5.0	4.1	3.1	5.3	4.1
Information and communication	2.8	1.7	2.3	3.0	1.7	2.4	2.9	1.6	2.3
Financial and insurance activities	1.5	3.6	2.5	1.3	3.6	2.4	1.5	3.3	2.4
Real estate activities	0.4	0.6	0.5	0.4	0.5	0.4	0.5	0.5	0.5
Professional, scientific and technical activities	2.2	3.4	2.8	2.4	3.4	2.9	2.1	3.3	2.6
Administrative and support service activities	3.4	2.7	3.1	3.3	2.8	3.0	3.1	2.8	3.0
Public administration and defence; compulsory social security	8.3	10.2	9.2	8.5	9.8	9.1	8.7	9.6	9.2
Education	4.0	15.3	9.4	4.1	15.0	9.4	4.0	14.9	9.2
Human health and social work activities	2.6	11.5	6.9	2.8	12.2	7.3	2.8	11.8	7.1
Arts, entertainment and recreation	1.4	1.6	1.5	1.3	1.7	1.5	1.4	1.8	1.6
Other services	1.1	2.0	1.6	1.0	2.0	1.5	1.0	2.2	1.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] By TEÁOR'08.
Source: *KSH MEF*.
Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_09

Table 4.10: Employed in their present job since 0–6 months, per cent

BPDATA

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Hungary	8.2	8.5	6.8	7.2	6.3	6.6	7.2	6.8	7.0	6.7	7.5	7.6	7.4	7.9	7.3

Source: *KSH MEF*, IV. quarterly waves.
Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_10

BPDATA

Table 4.11: Distribution of employees in the competitive sector[a] by firm size, per cent

Year	Less than 20	20-49	50–249	250–999	1000 and more
	employees				
2000	20.2	7.0	23.5	22.5	26.8
2001	18.5	7.5	24.3	23.0	26.7
2002	21.6	14.0	21.5	20.1	22.9
2003	23.0	15.3	20.5	19.3	21.8
2004	23.6	14.8	21.3	18.3	22.0
2005	27.0	15.0	20.5	17.5	20.0
2006	15.7	10.7	25.7	24.3	23.6
2007	25.2	14.2	20.0	18.4	22.2
2008	26.0	15.7	20.7	18.9	18.6
2009	23.4	15.7	19.7	18.4	22.8
2010	23.5	15.7	18.6	18.0	24.2
2011	24.9	15.6	18.5	17.7	23.4

[a] Firms employing 5 or more workers.
Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_11

BPDATA

Table 4.12: Employees of the competitive sector[a] by the share of foreign ownership, per cent

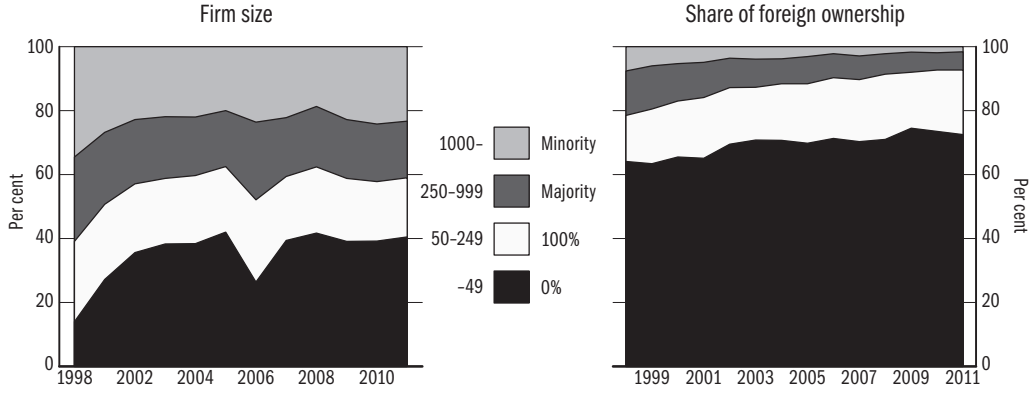
Share of foreign ownership	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
100%	19.0	17.7	16.5	17.7	18.6	19.0	19.4	20.4	17.5	19.2	20.2
Majority	11.0	9.2	8.8	7.8	8.5	7.5	7.4	6.4	6.3	5.4	5.7
Minority	4.9	3.6	3.9	3.8	3.1	2.2	2.9	2.2	1.7	1.9	1.6
0%	65.1	69.5	70.8	70.7	69.8	71.3	70.3	71.0	74.6	73.5	72.4

[a] Firms employing 5 or more workers.
Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_12

BPDATA

Figure 4.3: Employees of the corporate sector by firm size and by the share of foreign ownership



Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena04_03

Table 4.13: Employment rate of population aged 15–74 by age group, males, per cent

BPDATA

Year	15–19	20–24	25–49	50–54	55–59	60–64	65–74	Total
1992	14.6	64.7	82.8	71.8	48.7	17.1	9.9	58.9
1998	11.4	59.9	78.8	66.0	38.3	10.0	3.2	54.4
1999	10.6	60.3	80.5	69.0	44.0	10.4	3.8	56.2
2000	8.4	58.9	80.9	69.6	49.6	11.8	3.8	56.8
2001	7.9	56.7	81.6	68.2	51.3	13.1	3.1	57.1
2002	5.6	53.1	81.9	68.6	52.8	14.4	3.4	57.1
2003	4.8	51.8	82.2	69.7	55.2	16.8	3.8	57.6
2004	4.5	46.5	82.7	69.7	54.0	20.1	4.3	57.5
2005	4.0	43.6	82.5	70.1	56.6	20.9	4.2	57.4
2006	4.2	43.9	83.3	70.3	58.6	19.2	4.3	58.0
2007	3.7	43.8	83.7	70.7	58.2	18.9	4.7	58.0
2008	3.5	42.2	83.1	71.2	55.1	16.8	4.9	57.2
2009	2.5	36.6	80.5	70.5	57.1	17.2	5.0	55.5
2010	2.1	36.8	79.6	69.6	57.4	16.9	4.8	54.9
2011	2.2	35.9	81.0	72.0	58.1	17.9	5.9	55.8

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_13

Table 4.14: Employment rate of population aged 15–74 by age group, females, per cent

BPDATA

Year	15–19	20–24	25–49	50–54	55–59	60–64	65–74	Total
1992	16.0	54.0	72.2	58.4	18.2	10.7	5.3	46.6
1998	10.7	47.5	66.3	52.3	13.6	5.0	1.2	41.0
1999	8.7	48.1	67.3	59.4	16.2	5.5	1.6	42.3
2000	8.0	45.9	67.8	62.5	20.0	5.1	1.8	43.0
2001	6.3	44.2	68.0	62.1	23.2	5.5	1.3	43.1
2002	4.3	44.2	67.0	64.0	28.3	6.0	1.5	43.3
2003	3.1	41.9	67.8	65.8	35.1	7.3	2.0	44.3
2004	2.7	37.4	67.2	66.0	39.8	9.0	1.9	44.1
2005	2.6	34.7	67.4	66.6	41.7	9.6	1.5	44.2
2006	2.5	33.9	67.5	67.9	42.6	8.9	1.6	44.4
2007	2.1	32.5	67.8	68.3	40.0	9.7	2.1	44.3
2008	1.9	31.0	67.7	68.7	38.7	10.0	2.3	44.0
2009	1.5	30.0	66.6	68.5	41.1	10.0	2.2	43.4
2010	1.9	30.3	66.5	69.7	46.9	9.8	2.5	43.9
2011	1.6	30.2	66.1	68.9	50.7	11.1	2.6	44.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_14

BPDATA

Table 4.15: Employment rate of population aged 15–64 by level of education, males, per cent

Year	8 grades of primary school or less	Vocational school	Secondary school	College, university	Total
1993	35.6	75.8	71.8	86.3	60.0
1998	35.0	75.3	67.0	84.9	60.4
1999	33.6	76.8	68.3	86.8	62.4
2000	33.6	77.4	67.9	87.1	63.1
2001	33.0	77.6	67.3	87.4	62.9
2002	32.0	77.6	67.1	85.8	62.9
2003	32.4	76.5	67.8	86.4	63.4
2004	31.0	75.7	67.3	87.1	63.1
2005	31.6	74.7	66.9	86.9	63.1
2006	31.5	75.2	67.5	85.7	63.8
2007	31.6	74.6	67.5	85.9	64.0
2008	31.3	72.6	66.5	84.7	63.0
2009	29.0	69.9	65.1	83.1	61.1
2010	28.7	68.1	64.6	82.1	60.4
2011	29.6	68.4	64.6	83.8	61.2

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_15

BPDATA

Table 4.16: Employment rate of population aged 15–64 by level of education, females, per cent

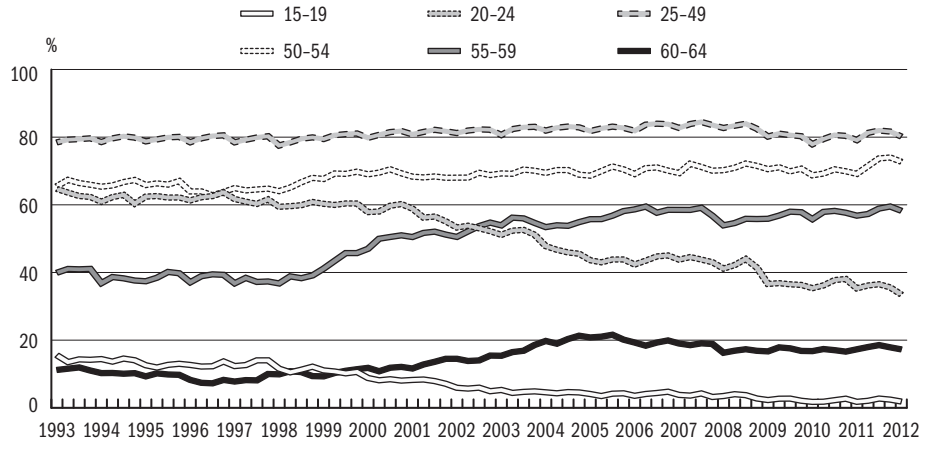
Year	8 grades of primary school or less	Vocational school	Secondary school	College, university	Total
1993	30.8	65.0	64.0	79.2	49.3
1998	26.6	60.5	58.1	76.9	47.3
1999	26.1	61.4	59.0	77.5	49.0
2000	26.0	61.0	59.3	77.8	49.7
2001	26.1	60.8	59.2	77.8	49.8
2002	26.0	60.4	58.6	77.9	49.8
2003	25.3	59.7	59.5	78.3	50.9
2004	25.0	58.8	58.1	78.1	50.7
2005	25.1	57.6	57.9	78.9	51.0
2006	24.5	58.2	57.5	77.6	51.1
2007	24.0	57.8	57.2	75.4	50.9
2008	23.9	55.5	56.4	75.5	50.6
2009	23.0	54.3	54.9	74.4	49.9
2010	23.6	56.4	54.3	74.6	50.6
2011	22.5	56.4	54.2	74.4	50.6

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent04_16

Figure 4.4: Activity rate by age groups, males aged 15-64, quarterly

BPDATA

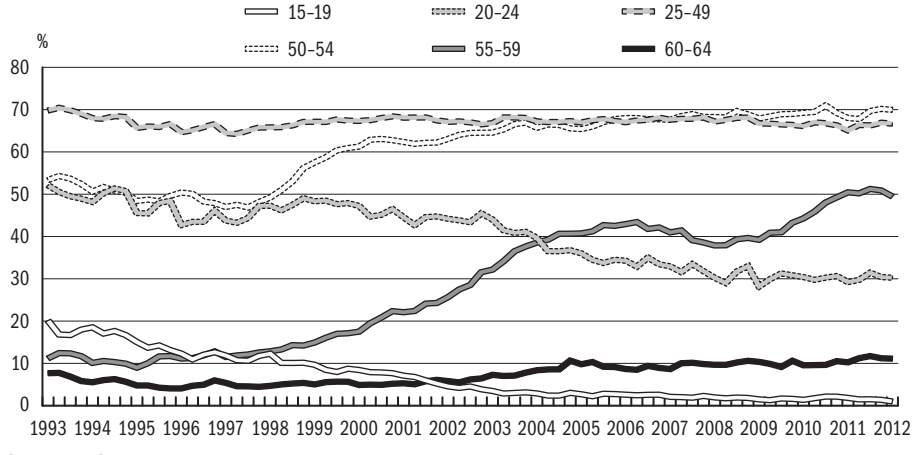


Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena04_04

Figure 4.5: Activity rate by age groups, females aged 15-64, quarterly

BPDATA



Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena04_05

BPDATA

Table 5.1: Unemployment rate by gender and share of long term unemployed, per cent

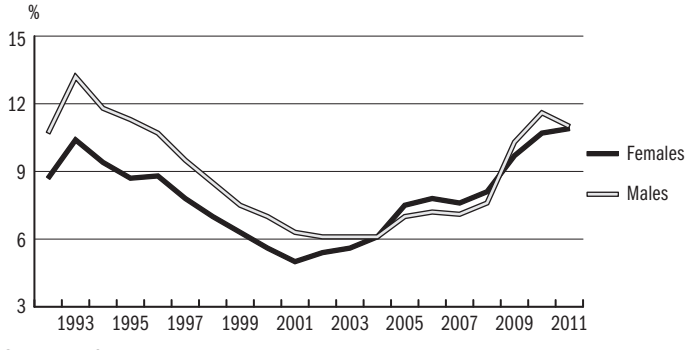
Year	Unemployment rate			Share of long term unemployed[a]
	Males	Females	Total	
1992	10.7	8.7	9.8	..
1993	13.2	10.4	11.9	..
1994	11.8	9.4	10.7	43.2
1995	11.3	8.7	10.2	50.6
1996	10.7	8.8	9.9	54.4
1997	9.5	7.8	8.7	51.3
1998	8.5	7.0	7.8	48.8
1999	7.5	6.3	7.0	49.5
2000	7.0	5.6	6.4	49.1
2001	6.3	5.0	5.7	46.7
2002	6.1	5.4	5.8	44.9
2003	6.1	5.6	5.9	43.9
2004	6.1	6.1	6.1	45.0
2005	7.0	7.5	7.2	46.2
2006	7.2	7.8	7.5	46.8
2007	7.1	7.6	7.4	48.2
2008	7.6	8.1	7.8	47.6
2009	10.3	9.7	10.0	43.0
2010	11.6	10.7	11.2	50.9
2011	11.0	10.9	10.9	49.6

[a] Long term unemployed are those who have been without work for 12 months or more, the denominator does not include those starting new jobs.
Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_01

BPDATA

Figure 5.1: Unemployment rates by gender



Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena05_01

Table 5.2: Unemployment rate by level of education, males, per cent

BPDATA

Year	8 grades of primary school or less	Vocational school	Secondary school	College, university	Total
1993	20.3	15.0	9.7	2.9	13.5
1998	14.6	9.1	5.9	2.2	8.5
1999	14.3	8.2	5.0	1.5	7.5
2000	13.4	7.7	4.8	1.6	7.0
2001	13.6	6.4	4.3	1.2	6.3
2002	14.1	6.2	4.0	1.4	6.1
2003	13.6	6.6	3.9	1.6	6.1
2004	14.3	6.4	4.1	1.7	6.1
2005	15.6	7.4	4.9	2.3	7.0
2006	17.3	7.0	5.2	2.7	7.2
2007	18.4	6.8	5.1	2.4	7.1
2008	19.8	7.6	5.3	2.3	7.6
2009	24.4	10.6	7.7	3.8	10.3
2010	26.9	12.1	8.4	4.9	11.6
2011	25.0	12.0	8.2	4.3	11.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. Since 1999 slight changes have occurred in the categorisation system by highest education level.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_02

Table 5.3: Composition of the unemployed by level of education, males, per cent

BPDATA

Year	8 grades of primary school or less	Vocational school	Secondary school	College, university	Total
1993	39.0	40.8	17.3	2.8	100.0
1996	37.6	44.0	15.1	3.3	100.0
1997	38.9	43.7	15.4	2.0	100.0
1998	37.4	42.0	17.2	3.4	100.0
1999	34.5	45.3	17.4	2.8	100.0
2000	32.9	45.8	17.9	3.4	100.0
2001	36.5	43.2	17.5	2.8	100.0
2002	36.7	43.3	16.7	3.3	100.0
2003	34.0	44.7	17.2	4.1	100.0
2004	33.9	42.6	18.6	4.9	100.0
2005	32.1	43.1	19.0	5.8	100.0
2006	33.4	40.0	20.0	6.6	100.0
2007	34.9	38.8	20.3	6.0	100.0
2008	35.2	39.4	19.8	5.6	100.0
2009	31.0	40.1	21.9	7.0	100.0
2010	30.1	40.2	21.5	8.2	100.0
2011	28.8	41.2	22.1	7.9	100.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. Since 1999 slight changes have occurred in the categorisation system by highest education level.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_03

BPDATA

Table 5.4: Unemployment rate by level of education, females, per cent

Year	8 grades of primary school or less	Vocational school	Secondary school	College, university	Total
1993	14.6	12.8	8.1	3.2	10.4
1998	11.6	7.8	5.8	1.8	7.0
1999	10.5	8.0	5.2	1.3	6.3
2000	9.1	7.4	4.9	1.5	5.6
2001	8.4	6.4	4.0	1.6	5.0
2002	9.3	6.5	4.4	2.4	5.4
2003	10.5	7.2	4.4	1.9	5.6
2004	10.3	8.0	5.3	2.9	6.1
2005	13.0	9.8	6.7	3.1	7.5
2006	15.8	10.1	6.4	2.8	7.8
2007	16.0	9.4	6.2	3.3	7.6
2008	17.5	9.5	6.9	3.2	8.1
2009	21.6	12.4	7.7	4.1	9.7
2010	22.8	12.6	9.5	4.5	10.7
2011	24.3	12.6	9.9	4.6	10.9

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. Since 1999 slight changes have occurred in the categorisation system by highest education level.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_04

BPDATA

Table 5.5: Composition of the unemployed by level of education, females, per cent

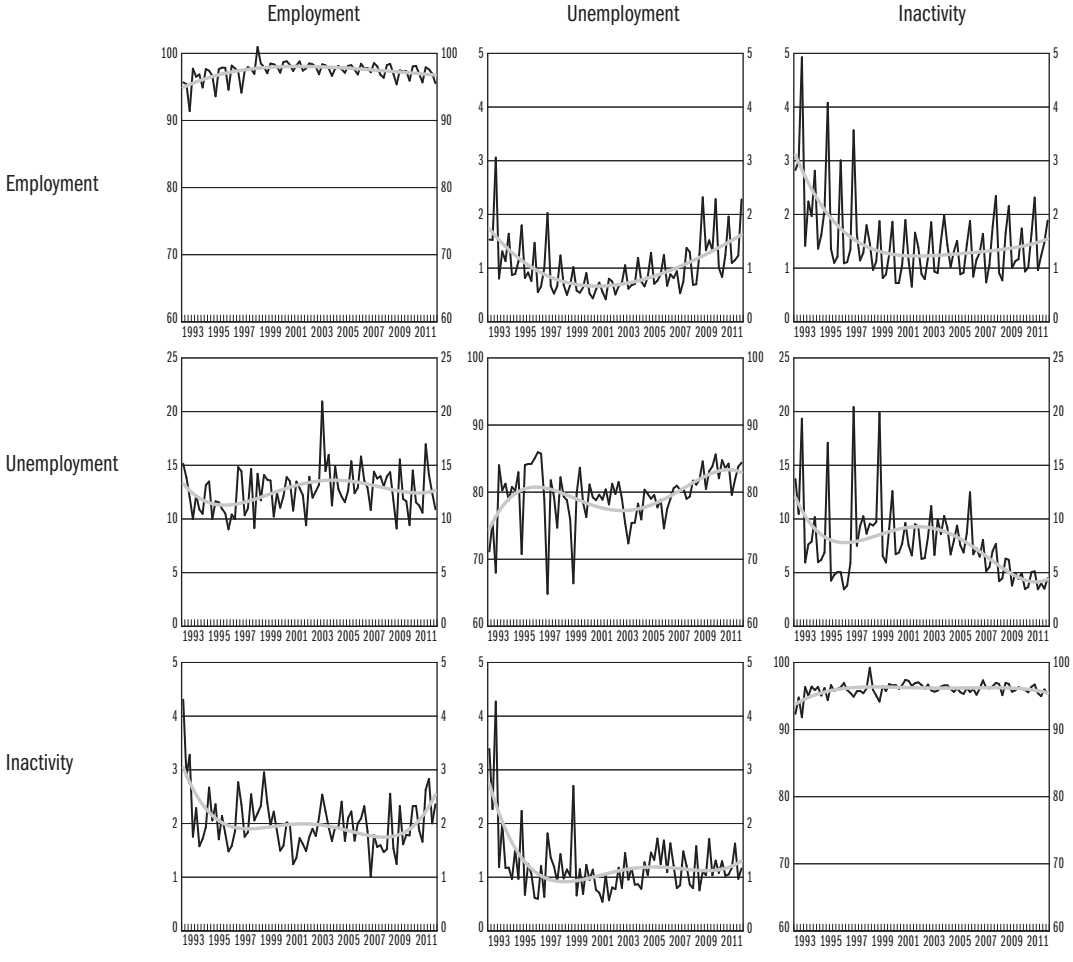
Year	8 grades of primary school or less	Vocational school	Secondary school	College, university	Total
1993	45.8	22.6	27.4	4.2	100.0
1996	38.2	24.9	31.6	5.4	100.0
1997	44.2	23.2	28.4	4.2	100.0
1998	41.6	22.7	31.4	4.3	100.0
1999	36.2	26.2	33.8	3.8	100.0
2000	31.8	28.2	35.0	5.0	100.0
2001	33.7	28.0	32.2	6.1	100.0
2002	33.2	26.0	32.2	8.5	100.0
2003	32.7	28.3	32.0	7.0	100.0
2004	27.8	27.4	34.2	10.6	100.0
2005	28.2	27.1	35.2	9.5	100.0
2006	31.5	27.5	32.5	8.5	100.0
2007	31.2	26.6	31.7	10.5	100.0
2008	32.2	24.3	33.3	10.2	100.0
2009	32.1	26.1	30.3	11.4	100.0
2010	30.5	24.3	34.0	11.2	100.0
2011	30.2	23.6	34.4	11.8	100.0

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. Since 1999 slight changes have occurred in the categorisation system by highest education level.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_05

Figure 5.2: Intensity of quarterly flows between labour market status, population between 15–64 years

BPDATA



Note: The calculations were carried out for the age group between 15-64 based on KSH labour force survey microdata. The probability of transition is given by the number of people who transitioned from one status to the other in the quarter, divided by the initial size of the group in the previous quarter, which were then corrected to preserve the consistency of stock flows. The light curves show the trend smoothed using a 4th degree polynomial.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena05_02

BPDATA

Table 5.6: The number of unemployed[a] by duration of job search, in thousands

Year	Length of job search, weeks [month]								Total
	1–4 [<1]	5–14 [1–3]	15–26 [4–6]	27–51 [7–11]	52 [12]	53–78 [13–18]	79–104 [19–24]	105– [>24]	
1992	43.9	90.9	96.4	110.7	10.6	41.7	38.4	n.a.	432.6
1993	36.2	74.8	87.9	120.5	14.7	75.1	83.7	n.a.	492.9
1994	30.5	56.5	65.0	91.9	8.4	63.0	73.8	40.4	429.5
1995	23.0	51.0	56.5	69.4	20.2	57.2	34.3	93.2	404.8
1996	19.9	46.4	49.3	61.5	18.2	56.1	37.1	100.2	388.7
1997	16.1	43.7	45.9	54.4	15.7	44.5	31.1	77.3	328.7
1998	12.9	44.2	44.5	45.7	16.0	39.0	27.6	63.5	293.4
1999	15.4	44.1	38.8	46.0	13.2	38.1	26.8	62.3	284.7
2000	16.7	38.5	35.1	42.8	12.7	36.9	23.6	55.4	261.3
2001	14.9	37.0	33.2	38.6	11.5	31.6	20.9	44.2	231.9
2002	15.5	39.4	34.8	40.7	11.6	32.7	19.8	42.5	237.0
2003	15.9	42.1	38.9	42.0	14.5	27.6	17.6	43.0	241.6
2004	13.0	42.0	39.9	41.8	13.5	33.4	19.6	47.2	250.4
2005	14.8	48.9	44.1	51.3	14.1	41.0	27.4	54.3	295.9
2006	13.3	50.7	48.3	51.9	17.4	41.5	26.6	58.8	308.5
2007	13.8	49.4	44.3	50.1	12.7	43.3	26.0	64.9	304.5
2008	13.7	50.4	47.8	53.5	13.4	39.6	27.2	74.8	320.4
2009	18.8	71.9	67.0	77.4	18.1	51.2	19.8	88.4	412.6
2010	16.9	64.9	63.1	84.3	23.6	75.9	43.3	95.4	467.4
2011	28.7	70.7	62.8	70.1	18.3	64.6	40.4	105.3	460.8

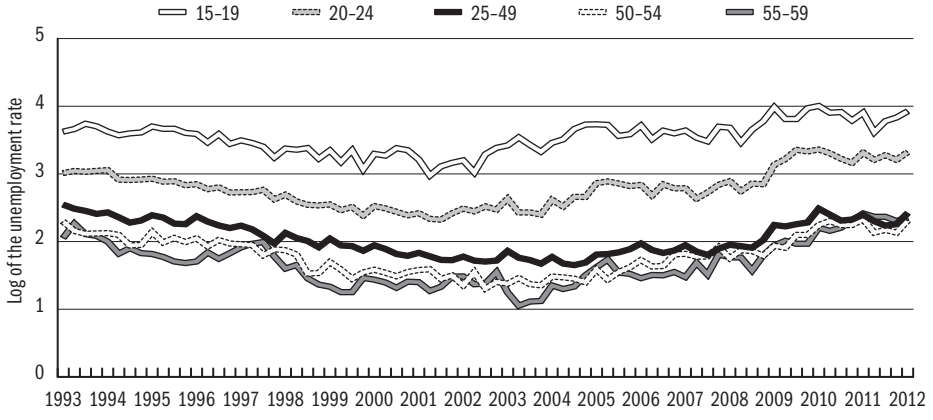
[a] Not including those unemployed who will got a new job within 30 days; since 2003: within 90 days.

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.

Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_06

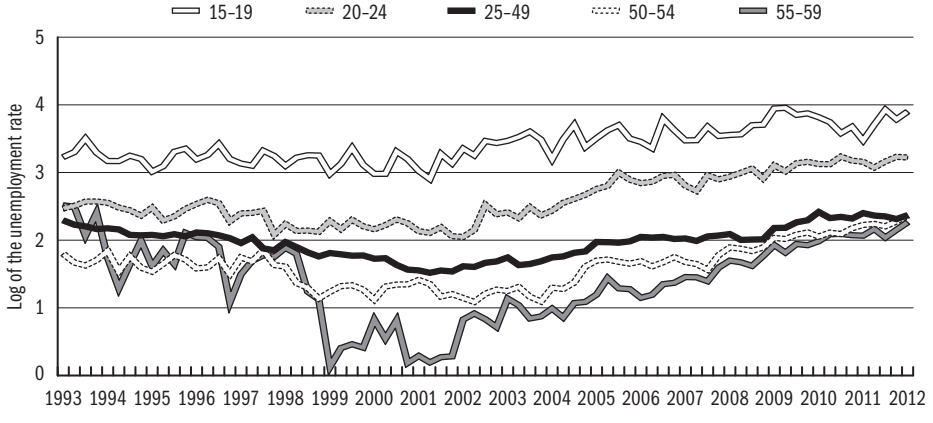
Figure 5.3: Unemployment rate by age groups, males aged 15-59, quarterly



Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena05_03

Figure 5.4: Unemployment rate by age groups, females aged 15-59, quarterly



Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena05_04

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Table 5.7: Registered unemployed[a] and LFS unemployment

	Registered unemployed		LFS unemployed, total		LFS unemployed, age 15-24	
Year	in thousands	rate in %	in thousands	rate in %	in thousands	rate in %
1990	47.7	-	..	..	..	..
1991	227.3	4.1	..	..	..	..
1992	557.0	10.3	444.2	9.8	120.0	17.5
1993	671.8	12.9	518.9	11.9	141.3	21.3
1994	568.4	11.3	451.2	10.7	124.7	19.4
1995	507.7	10.6	416.5	10.2	114.3	18.6
1996	500.6	11.0	400.1	9.9	106.3	17.9
1997	470.1	10.5	348.8	8.7	95.8	15.9
1998	423.1	9.5	313.0	7.8	87.6	13.4
1999	409.5	9.7	284.7	7.0	78.6	12.4
2000	390.5	9.3	262.5	6.4	70.7	12.1
2001	364.1	8.5	232.9	5.7	55.7	10.8
2002	344.7	8.0	238.8	5.8	56.5	12.3
2003	357.2	8.3	244.5	5.9	54.9	13.4
2004	375.9	8.7	252.9	6.1	55.9	15.5
2005	409.9	9.4	303.9	7.2	66.9	19.4
2006	393.5	9.0	316.8	7.5	64.1	19.1
2007	426.9	9.7	311.9	7.4	57.6	18.0
2008	442.3	10.0	329.2	7.8	61.0	19.9
2009	561.8	12.8	420.7	10.0	79.2	26.4
2010	582.7	13.3	474.8	11.2	79.2	26.6
2011	582.9	13.2	467.9	10.9	79.1	27.8

[a] Since 1st of November, 2005: database of registered jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployed to registered jobseekers.

Note: The denominator of registered unemployment/jobseekers' rate in the economically active population on 1st January the previous year.

Source: Registered unemployment/jobseekers: *NFSZ;* LFS unemployment: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_07

BPDATA

Figure 5.5: Registered and LFS unemployment rates

Note: Since 1st of November, 2005: database of registered jobseekers.

Source: Registered unemployment/jobseekers: *NMH*; LFS unemployment: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena05_05

Table 5.8: Composition of the registered unemployed[a] by educational attainment, yearly averages, per cent

BPDATA

Educational attainment	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
8 grades of primary school or less	40.8	40.6	40.4	41.0	42.0	42.4	42.7	42.3	41.9	42.0	42.4	43.3	40.1	39.3	40.3
Vocational school	35.6	36.0	35.7	34.9	34.1	33.5	32.9	32.3	32.4	32.1	31.5	30.9	32.5	31.4	29.8
Vocational secondary school	12.8	12.9	13.2	13.2	13.1	13.2	13.1	13.4	13.5	13.4	13.3	13.1	14.4	15.0	14.9
Grammar school	8.0	7.9	8.0	8.0	7.7	7.6	7.5	7.7	7.9	8.0	8.2	8.2	8.5	9.1	9.5
College	2.0	1.9	2.0	2.1	2.2	2.4	2.7	3.1	3.2	3.3	3.3	3.3	3.2	3.7	3.8
University	0.7	0.7	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.2	1.2	1.5	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Since 1st of November, 2005: registered jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployees to registered jobseekers.
Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_08

Table 5.9: The distribution of registered unemployed school-leavers[a] by educational attainment, yearly averages, per cent

BPDATA

Educational attainment	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
8 grades of primary school or less	20.2	23.4	25.3	26.8	31.1	33.7	34.7	35.2	36.1	38.2	40.1	41.3	37.7	35.2	35.6
Vocational school	35.7	34.1	30.9	27.8	23.7	20.6	20.4	20.2	20.5	19.7	18.1	17.3	18.9	18.9	18.5
Vocational secondary school	23.9	24.2	25.0	25.4	25.3	25.5	23.2	22.1	21.5	20.3	20.7	21.2	23.1	23.9	23.6
Grammar school	15.5	14.0	13.6	13.7	12.6	11.6	10.8	10.7	10.8	11.7	12.8	13.3	13.7	14.3	15.0
College	3.5	3.4	4.0	4.8	5.5	6.2	7.7	8.1	7.8	6.9	5.8	4.9	4.5	4.8	4.2
University	1.1	1.0	1.2	1.5	1.8	2.4	3.3	3.6	3.4	3.0	2.5	2.0	2.1	2.8	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Since 1st of November, 2005: registered school-leaver jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployees to registered jobseekers.
Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_09

BPDATA

Table 5.10: Registered unemployed[a] by economic activity as observed in the LFS, per cent

Year	Employed	LFS-unemployed	Inactive	Total	Year	Employed	LFS-unemployed	Inactive	Total
1992	5.1	71.6	23.3	100.0	2002	4.4	47.4	48.2	100.0
1993	10.0	63.6	26.4	100.0	2003	9.4	44.1	46.5	100.0
1994	14.4	54.5	31.1	100.0	2004	3.0	53.5	43.5	100.0
1995	11.8	53.7	34.5	100.0	2005	2.3	59.7	38.0	100.0
1996	13.7	51.8	34.5	100.0	2006	3.9	58.7	37.5	100.0
1997	18.7	44.1	37.2	100.0	2007	3.7	62.6	33.7	100.0
1998	24.8	35.1	40.1	100.0	2008	3.7	63.1	33.2	100.0
1999	6.7	55.8	37.5	100.0	2009	3.7	67.5	28.8	100.0
2000	4.7	54.3	41.0	100.0	2010	3.0	71.1	25.9	100.0
2001	6.5	45.2	48.3	100.0	2011	3.3	67.2	29.5	100.0

[a] Since 1st of November, 2005: database of registered jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployed to registered jobseekers.

Note: Up to 2000 data are weighted on the basis of the 1990 Population Census. The data pertain to those who consider themselves registered jobseekers in the KSH MEF. From 1999 those who reported that their last contact with the employment center was more than two months ago were filtered from among those who reported themselves as registered unemployed.

Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_10

BPDATA

Table 5.11: Selected time series of registered unemployment, monthly averages, in thousands and per cent

	1994	1995	1996	1997	1998	1999	2000	2001	2002
Registered unemployment[a]	568.4	507.7	500.6	470.1	423.1	409.5	390.5	364.1	344.7
Of which: School-leavers	62.1	54.5	46.2	42.4	32.5	29.9	26.0	26.8	28.5
Non school-leavers	506.2	453.2	454.4	427.7	390.6	379.6	364.4	337.4	316.2
Male	333.0	293.8	284.1	267.1	233.4	221.4	209.7	196.4	184.6
Female	235.3	213.8	216.5	203.0	189.7	188.1	180.8	167.7	160.1
25 years old and younger	153.3	134.2	124.0	105.8	89.9	85.4	79.1	75.6	71.1
Manual workers	467.6	414.3	407.4	386.3	349.0	336.8	321.2	302.0	286.3
Non manual workers	100.7	93.4	93.2	83.8	74.1	72.7	69.3	62.1	58.4
Unemployment benefit recipients[b]	228.9	182.8	171.7	141.7	130.7	140.7	131.7	119.2	114.9
Unemployment assistance recipients[c]	190.3	210.0	211.3	201.3	182.2	148.6	143.5	131.2	113.4
Unemployment rate[d]	11.3	10.6	11.0	10.5	9.5	9.7	9.3	8.5	8.0
Shares within registered unemployed, %									
School-leavers	10.9	10.7	9.2	9.0	7.7	7.3	6.7	7.3	8.3
Male	58.6	57.9	56.7	56.8	55.2	54.1	53.7	53.9	53.5
25 years old and younger	27.0	26.4	24.8	22.5	21.3	20.9	20.3	20.8	20.6
Manual workers	82.3	81.6	81.4	82.2	82.5	82.3	82.2	82.9	83.1
Flows, in thousands									
Inflow to the Register	42.3	45.7	52.8	56.1	55.4	57.2	54.1	57.0	56.0
Of which: school-leavers	7.8	8.0	7.5	9.2	9.8	9.3	8.0	7.8	7.8
Outflow from the Register	51.7	47.6	54.3	57.3	60.4	57.2	56.8	59.4	55.8
Of which: school-leavers	7.9	8.5	8.9	9.0	11.0	9.4	8.2	7.7	7.5

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Registered unemployment[a]	357.2	375.9	409.9	393.5	426.9	442.3	561.8	582.7	582.9
Of which: School-leavers	31.3	33.8	40.9	38.7	40.4	41.4	49.3	52.6	52.9
Non school-leavers	325.9	342.2	369.1	354.7	386.5	400.9	512.5	530.1	529.9
Male	188.0	193.3	210.4	200.9	219.9	228.3	297.9	305.0	297.1
Female	169.2	182.6	199.5	192.5	207.0	214.0	263.9	277.7	285.8
25 years old and younger	71.6	71.4	78.9	75.8	80.3	75.9	104.3	102.8	102.3
Manual workers	296.2	308.5	336.2	321.9	..	..	..	..	..
Non manual workers	61.0	67.4	73.7	71.6	..	..	..	..	..
Unemployment benefit recipients[b]	120.0	124.0	134.4	151.5	134.6	136.5[e]	202.1	187.7	159.9
Unemployment assistance recipients[c]	116.2	120.4	133.4	121.8	133.0	147.5	156.0	167.8	182.1
Unemployment rate[d]	8.3	8.7	9.4	9.0	9.7	10.0	12.8	13.3	13.2
Shares within registered unemployed, %									
School-leavers	8.8	9.0	10.0	9.8	9.5	9.4	8.8	9.0	9.1
Male	52.6	51.4	51.3	51.1	51.5	51.6	53.0	52.3	51.0
25 years old and younger	20.0	19.0	19.2	16.5	18.8	17.2	18.6	17.6	17.5
Manual workers	82.9	82.1	82.0	81.8	..	..	..	..	..
Flows, in thousands									
Inflow to the Register	54.8	57.8	60.7	50.8	51.4	54.0	69.0	65.3	70.9
Of which: school-leavers	7.7	7.6	8.2	7.0	6.2	6.3	7.5	7.9	8.2
Outflow from the Register	53.5	54.4	59.8	51.4	48.4	51.3	58.4	66.4	74.2
Of which: school-leavers	7.6	7.1	7.9	7.1	6.0	6.2	6.7	7.5	8.1

[a] Since 1st of November, 2005: registered jobseekers. (The data concern the closing date of each month.) From the 1st of November, 2005 the Employment Act changed the definition of registered unemployed to registered jobseekers.

[b] Since 1st of November, 2005: jobseeker benefit recepients. From 2011. September 1st, the system of jobseeking support changed.

[c] Only recipients who are in the NMH register. Those receiving the discontinued income support supplement were included in the number of those receiving income support supplement up to 2004, and in the number of those receiving regular social assistance from 2005 to 2008. From 2009, those receiving social assistance were included in a new support type, the on call support. This allowance was replaced by the wage replacement support from 2011. January 1st, then from 2011. September 1st, the name was changed to employment substitution support.

[d] Relative index: registered unemployment rate in the economically active population. From 1st of November, 2005, registered jobseekers' rate in the economically active population.

[e] The new IT system introduced at the NFSZ in 2008 made the methodological changes possible:

1) The filtering out of those returning after or starting a break from the number of those entering or leaving the different types of jobseeking support. The main reasons for a break are work for short time periods, receipt of child support (GYES) or TGYÁS, or involvement in training.

2) Taking into account in the previous period the number of those entrants, for whom the first accounting of the jobseeking support was delayed due to missing documentation.

2008 data, comparable to 2009: 141.5 thousand people.

Source: *NFSZ REG*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_11

BPDATA

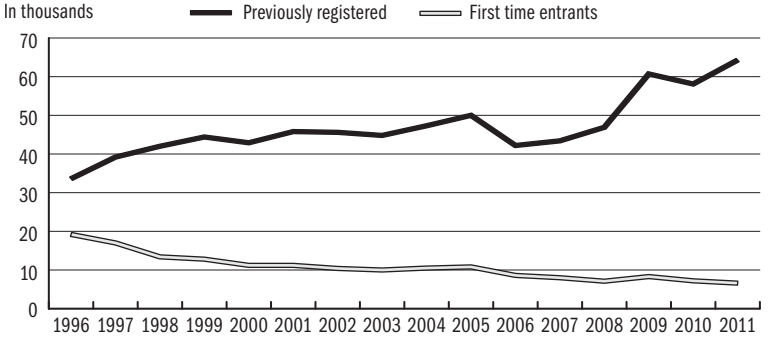
Table 5.12: Monthly entrants to the unemployment register[a], monthly averages, in thousands

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
First time entrants	17.0	13.4	12.8	11.2	11.2	10.4	10.0	10.5	10.8	8.6	8.0	7.1	8.3	7.2	6.6
Previously registered	39.2	42.0	44.4	42.9	45.8	45.6	44.8	47.3	50.0	42.2	43.4	46.9	60.7	58.1	64.3
Together	56.1	55.4	57.2	54.1	57.0	56.0	54.8	57.8	60.7	50.8	51.4	54.0	69.0	65.3	70.9

[a] Since 1st of November, 2005: database of jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployed to registered jobseekers.
Source: *NFSZ REG*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_12

Figure 5.6: Entrants to the unemployment register, monthly averages, in thousands



Source: *NFSZ REG*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena05_06

Table 5.13: Benefit recepients and participation in active labour market programs

BPDATA

Year		Unemployment benefit[a]	Regular social assistance[b]	UA for school-leavers	Do not receive provision	Public work[c]	Retraining[c]	Wage subsidy[c]	Other programmes[c]	Total
1990	In thousands	42.5	–	–	18.6	..	..	..	..	61.0
	Per cent	69.6	n.a.	n.a.	30.4	..	..	..	..	100.0
2000	In thousands	117.0	139.7	0.0	106.5	26.7	25.3	27.5	73.5	516.2
	Per cent	22.7	27.1	0.0	20.6	5.2	4.9	5.3	14.2	100.0
2001	In thousands	111.8	113.2	0.0	105.2	29.0	30.0	25.8	37.2	452.2
	Per cent	24.7	25.0	0.0	23.3	6.4	6.6	5.7	8.2	100.0
2002	In thousands	104.8	107.6	–	115.3	21.6	23.5	21.2	32.8	426.8
	Per cent	24.6	25.2	–	27.0	5.1	5.5	5.0	7.7	100.0
2003	In thousands	105.1	109.5	–	125.0	21.2	22.5	20.1	36.6	440.0
	Per cent	23.9	24.9	–	28.4	4.8	5.1	4.6	8.3	100.0
2004	In thousands	117.4	118.4	–	132.3	16.8	12.6	16.8	28.5	442.8
	Per cent	26.5	26.7	–	29.9	3.8	2.8	3.8	6.4	100.0
2005	In thousands	125.6	127.8	–	140.2	21.5	14.7	20.8	31.0	481.6
	Per cent	26.1	26.5	–	29.1	4.5	3.1	4.3	6.4	100.0
2006	In thousands	117.7	112.9	–	146.4	16.6	12.3	14.6	13.8	434.3
	Per cent	27.1	26.0	–	33.7	3.8	2.8	3.4	3.2	100.0
2007	In thousands	128.0	133.1	–	151.8	19.3	14.6	23.4	6.8	477.0
	Per cent	27.6	28.7	–	32.7	2.7	2.3	3.7	2.3	100.0
2008	In thousands	120.7[d]	145.7	–	158.2	21.2	21.2	25.0	14.1	506.1
	Per cent	23.8	28.8	–	31.3	4.2	4.2	4.9	2.8	100.0
2009	In thousands	202.8	151.9	–	215.0	135.3	13.6	17.8	54.1	790.5
	Per cent	25.7	19.2	–	27.2	17.1	1.7	2.3	6.8	100.0
2010	In thousands	159.6	163.5	–	222.4	164.5	17.8	26.7	40.3	794.8
	Per cent	20.1	20.6	–	28.0	20.7	2.2	3.4	5.1	100.0
2011	In thousands	122.8	168.2	–	239.8	91.6	13.6	20.4	39.9	696.3
	Per cent	17.6	24.2	–	34.4	13.2	2.0	2.9	5.7	100.0

[a] Since 1st of November, 2005: jobseeker benefit recepients. From 2011. September 1st, the system of jobseeking support changed.

[b] Only recipients who are in the NFSZ register. Those receiving the discontinued income support supplement were included in the number of those receiving income support supplement up to 2004, and in the number of those receiving regular social assistance from 2005 to 2008. From 2009, those receiving social assistance were included in a new support type, the on call support. This allowance was replaced by the wage replacement support from 2011. January 1st, then from 2011. September 1st, the name was changed to employment substitution support.

[c] Up to 2008 the number financed from the MPA Decentralized Base, since 2009 the number financed from MPA, TAMOP.
Public-type employment: community service, public service, public work programmes.
Wage subsidy: wage subsidy, wage-cost subsidy, work experience acquisition assstance to career-starters, support for employment of availability allowance recipients, part-time emplolyment, wage support for those losing their job due to the crisis.
Other support: job preservation support, support to would-be entrepreneurs, contribution to costs related to commuting to work, job creation support, jobseeker's clubs.

[d] The new IT system introduced at the NFSZ in 2008 made the methodological changes possible:
1) The filtering out of those returning after or starting a break from the number of those entering or leaving the different types of jobseeking support. The main reasons for a break are work for short time periods, receipt of child support (GYES) or TGYÁS, or involvement in training.
2) Taking into account in the previous period the number of those entrants, for whom the first accounting of the jobseeking support was delayed due to missing documentation.
2008 data, comparable to 2009: 134.1 thousand people.

Note: The closing numbers from October of each year. For the percentage data, the sum of those registered and those taking part in labour market programs ≈100.0.
Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_13

BPDATA

Table 5.14: The number of registered unemployed[a] who became employed on subsidised and non-subsidised employment[b]

	2006		2007		2008		2009		2010		2011	
	persons	per cent	persons	per cent	persons	per cent	persons	per cent	persons	per cent	persons	per cent
Subsidised employment	130,081	37.4	104,842	32.7	118,703	34.0	170,464	40.0	198,974	38.5	282,673	48.5
Non-subsidised employment	217,606	62.6	215,686	67.3	230,558	66.0	255,356	60.0	317,622	61.5	299,716	51.5
Total	347,687	100.0	320,528	100.0	349,261	100.0	425,820	100.0	516,596	100.0	582,389	100.0

[a] Since 1st of November, 2005: registered jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployed to registered jobseekers.
[b] Annual totals, the number of jobseekers over the year who were placed. It reflects the placements at the time of their exit from the registry.
Source: *NMH*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_14

BPDATA

Table 5.15: The ratio of those who are employed among the former participants of ALMPs, per cent

Active labour market programmes	1996[a]	1997[a]	1998[a]	1999[a]	2000[a]	2001[a]	2002[a]	2003[a]	2004[a]	2005[a]	2006[a]	2007[a]	2008[a]	2009[b]	2010[b]	2011[b]
Suggested training programmes[c]	44.5	46.3	46.8	46.8	48.4	45.4	43.3	43.0	45.5	43.8	41.1	37.5	42.2	40.4	49.4	33.7
Accepted training programmes[d]	50.2	51.1	51.5	50.0	52.0	49.3	45.8	46.0	45.6	51.4	50.9	47.6	48.0	41.9	48.8	39.5
Retrainig of those who are employed[e]	92.8	90.4	94.7	94.8	94.9	94.2	92.7	93.3	92.1	90.4	..	92.3	93.9	..	59.9	53.4
Support for self-employment[f]	90.2	88.1	91.7	90.5	89.4	89.2	90.7	89.6	90.7	89.6	86.4	87.6	83.6	73.1	76.4	67.6
Wage subsidy programmes[g]	70.1	66.3	59.1	59.7	62.3	59.7	62.9	62.0	64.6	62.6	62.3	63.4	65.0	72.4	90.9	79.5
Work experience programmes[h]	–	65.7	59.1	55.8	57.9	64.5	66.9	66.1	66.5	66.8	66.6	66.3	74.6	..	..	96.9
Further employment programme[i]	–	72.1	75.1	68.5	73.8	71.6	78.4	78.2	71.5	70.9	65.0	77.5	–	–	–	–

[a] Three months after the end of programmes.
[b] Six months after the end of programmes.
[c] Suggested training: group traning programmes for jobseekers organized by the NFSZ.
[d] Accepted training: participation in programmes initiated by the jobseekers and accepted by NFSZ for full or partial support.
[e] Training for employed persons: training for those whose jobs are at risk of termination, if new knowledge allows them to adapt to the new needs of the employer.
[f] Support to help entrepeneurship: support of jobseekers in the amount of the monthly minimum wage or maximum HUF 3 million lumpsum support (to be repaid or not), aimed at helping them become individual entrepreneurs or self-employed.
[g] Wage support: aimed at helping the employment of disadvantaged persons, who would not be able to, or would have a harder time finding work without support.
[h] Work experience-gaining support: the support of new entrants with no work experience for 6-9 months, the amount of the support is equal to 50-80% of the wage costs. The instrument was discontinued after 2006. December 31. In 2009 they reintroduced the work experience gaining support for skilled new entrants, for employers who ensure employment of at least 4 hours a day and 365 days. The amount of the support is 50-100% of the wage cost. Monitoring for the first exiters are available from 2011.
[i] Further employment programmes: to support the continued employment of new entrants under the age of 25 for 9 months. Discontinued from December 31, 2006.
Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_15

Table 5.16: Distribution of registered unemployed[a], unemployment benefit recipients[b] and unemployment assistance recipients[c] by educational attainment

BPDATA

Educational attainment	1995	2001	2004	2005	2006	2007	2008	2008[e]	2009	2010	2011
Registered unemployed											
8 grades of primary school or less	43.6	42.3	42.7	41.8	41.5	42.8	43.8	–	40.0	39.2	39.9
Vocational school	34.5	34.2	32.2	32.6	32.3	31.5	30.7	–	33.1	31.4	29.8
Vocational secondary school	11.7	13.0	13.4	13.6	13.6	13.2	12.8	–	14.4	15.0	15.0
Grammar school	7.9	7.7	7.8	8.0	8.2	8.2	8.1	–	8.3	9.1	9.7
College	1.5	2.1	2.8	2.9	3.2	3.1	3.2	–	3.0	3.7	3.9
University	0.7	0.7	1.0	1.0	1.2	1.2	1.2	–	1.1	1.5	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	–	100.0	100.0	100.0
	482.7	359.6	350.7	388.1	359.6	402.7	415.6	–	549.0	546.0	553.3
Unemployment benefit recipients[d]											
8 grades of primary school or less	36.9	29.7	28.9	28.2	25.4	25.4	24.4	26.3	25.7	24.1	23.4
Vocational school	36.6	40.7	39.2	39.3	39.5	37.4	37.0	39.2	39.4	36.2	34.5
Vocational secondary school	14.9	16.7	17.7	17.9	18.7	19.2	19.3	18.3	18.5	19.7	20.1
Grammar school	8.3	9.0	9.3	9.5	10.1	10.9	11.0	10.6	10.1	11.6	12.3
College	2.2	2.9	3.6	3.7	4.5	5.0	6.0	5.7	4.5	5.8	6.7
University	1.0	1.0	1.3	1.4	1.8	2.1	2.3	2.1	1.7	2.6	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	164.1	110.3	100.3	104.9	91.5	119.3	92.5	126.9	200.5	165.8	145.9
Unemployment assistance recipients[c]											
8 grades of primary school or less	56.8	55.5	61.1	60.4	60.1	60.3	60.3	–	59.4	56.4	56.1
Vocational school	30.6	30.0	27.6	27.8	27.7	27.1	26.5	–	26.6	27.4	26.1
Vocational secondary school	6.9	7.4	6.1	6.4	6.5	6.8	6.8	–	7.5	8.6	9.0
Grammar school	4.5	5.1	4.2	4.3	4.5	4.4	4.7	–	4.8	5.6	6.3
College	0.8	0.9	0.8	0.9	1.0	1.1	1.2	–	1.2	1.5	1.8
University	0.3	0.3	0.2	0.2	0.3	0.3	0.4	–	0.4	0.5	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	–	100.0	100.0	100.0
	220.7	136.9	114.6	127.8	116.5	130.9	145.8	–	144.1	161.7	174.7

[a] Since 1st of November, 2005: registered jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployed to registered jobseekers.

[b] Since 1st of November, 2005: those receiving jobseeking support. From 2011. September 1st, the system of jobseeking support changed.

[c] Only recipients who are in the NFSZ register. Those receiving the discontinued income support supplement were included in the number of those receiving income support supplement up to 2004, and in the number of those receiving regular social assistance from 2005 to 2008. From 2009, those receiving social assistance were included in a new support type, the on call support. This allowance was replaced by the wage replacement support from 2011. January 1st, then from 2011. September 1st, the name was changed to employment substitution support.

[d] After 1st of November, 2005: jobseeking support. Does not contain those receiving unemployment aid prior to pension in 2004. From 2011. September 1st, the system of jobseeking support changed.

[e] The new IT system introduced at the NFSZ in 2008 made the methodological changes possible:

1) The filtering out of those returning after or starting a break from the number of those entering or leaving the different types of jobseeking support. The main reasons for a break are work for short time periods, receipt of child support (GYES) or TGYÁS, or involvement in training.

2) Taking into account in the previous period the number of those entrants, for whom the first accounting of the jobseeking support was delayed due to missing documentation.

The right-hand column of 2008 contains the 2008 data in a form comparable to the 2009 data.

Note: Data from the closing date of June in each year.

Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_16

BPDATA

Table 5.17: Outflow from the Register of Beneficiaries

Year	Total number of outflows	Of which: became employed, %	Of which: benefit period expired, %	Year	Total number of outflows	Of which: became employed, %	Of which: benefit period expired, %
1993	580,880	32.1	..	2003	297,640	26.7	65.2
1994	485,045	27.8	..	2004	308,027	27.4	64.6
1995	370,941	27.7	..	2005	329,738	27.2	63.0
1996	408,828	24.2	58.4	2006	234,273	33.2	53.7
1997	327,486	26.8	58.7	2007	251,889	33.4	46.9
1998	322,496	26.5	64.5	2008	232,151	40.0	48.7
1999	320,132	26.0	67.4	2008[a]	261,573	43.4	48.9
2000	325,341	28.1	64.6	2009	345,216	37.9	56.0
2001	308,780	27.2	65.1	2010	352,535	38.9	55.8
2002	303,288	27.6	66.7	2011	329,728	39.2	55.7

[a] The new IT system introduced at the NFSZ in 2008 made the methodological changes possible:
1) The filtering out of those returning after or starting a break from the number of those entering or leaving the different types of jobseeking support. The main reasons for a break are work for short time periods, receipt of child support (GYES) or TGYÁS, or involvement in training.
2) Taking into account in the previous period the number of those entrants, for whom the first accounting of the jobseeking support was delayed due to missing documentation.
The row of 2008[a] contains the data from 2008 in the form comparable to the 2009 data.
Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_17

BPDATA

Table 5.18: The distribution of the total number of labour market training participants[a]

Groups of training participants	1996	1997	1998	1999	2000	2001	2002	2003
Participants in suggested training	35,486	44,988	48,558	52,045	52,198	53,447	46,802	45,261
Participants in accepted training	31,167	26,522	26,906	28,311	30,949	32,672	31,891	28,599
One Step Forward (OFS) programme	–	–	–	–	–	–	–	–
Non-employed participants together	66,725	71,509	75,465	80,356	83,147	86,211	78,693	73,859
Of which: school-leavers	16,843	21,658	24,359	25,260	22,131	20,592	19,466	18,320
Employed participants	5,255	4,484	4,139	4,408	5,026	5,308	4,142	9,036
Total	71,980	75,993	79,604	84,764	88,173	91,519	82,835	82,895
	2004	2005	2006	2007	2008	2009	2010	2011
Participants in suggested training	33,002	29,252	36,212	32,747	48,561	41,373	50,853	32,172
Participants in accepted training	19,406	9,620	7,327	5,766	4,939	8,241	6,853	2,495
One Step Forward (OFS) programme	–	–	–	270	59,347	11,169	2,316	–
Non-employed participants together	52,407	38,872	43,539	38,783	112,847	60,783	57,706	34,667
Of which: school-leavers	12,158	9,313	1,365	1,111	18,719	21,103	12,030	7,935
Employed participants	7,487	4,853	3,602	3,467	37,466	12,496	336	908
Total	59,894	43,725	47,141	42,250	150,313	73,279	60,358	35,575

[a] The data contain the number of those financed from the NFA decentralized employment base, as well as those involved in training as a part of the HEFOP 1.1 and the TÁMOP 1.1.2 programs.
Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_18

Table 5.19: Employment ratio of participants ALMPs by gender, age groups and educational attainment for the programmes finished in 2011, per cent

BPDATA

	Non-employed participants			Supported self-employment[a]	Wage subsidy programme
	suggested training	accepted training	total		
By gender					
Males	35.4	37.5	35.6	68.2	79.7
Females	31.6	41.3	32.7	67.0	79.4
By age groups					
–20	16.5	14.8	16.4	22.6	23.8
20–24	38.3	40.0	38.4	65.0	82.9
25–29	35.3	37.8	35.5	64.4	79.7
–29 together	34.2	36.1	34.3	62.7	74.4
30–34	33.4	45.0	34.7	70.1	83.6
35–39	32.9	41.9	33.9	69.1	82.9
40–44	34.9	40.7	35.6	68.8	80.7
45–49	32.2	43.0	33.4	67.2	70.5
50–54	32.1	36.8	32.7	69.5	83.4
55+	35.4	36.3	35.5	70.8	83.4
By educational attainment					
Less than primary school	36.4	0.0	35.1	11.1	67.7
Primary school	29.2	37.3	29.9	57.4	78.2
Vocational school for skilled workers	35.5	40.8	36.0	69.0	79.1
Vocational school	29.1	47.7	31.2	59.3	79.6
Special vocational school	–	–	–	–	–
Vocational secondary school	37.7	41.6	38.1	70.1	82.4
Technicians secondary school	36.9	47.5	37.9	77.4	80.2
Grammar school	32.4	41.9	33.1	66.3	80.0
College	33.7	36.4	34.2	65.5	82.5
University	35.0	25.8	33.2	71.4	81.6
Total	33.7	39.5	34.3	67.6	79.5

[a] Survival rate.
Note: 6 months after the end of each programme.
Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_19

Table 5.20: Distribution of the average annual number of those with no employment status who participate in the training by the type of training, percentage

BPDATA

Types of training	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Approved qualification	80.4	77.9	79.8	79.6	78.8	78.7	77.6	78.3	75.1	72.9	71.5	69.0	65.8	63.6	65.2	68.6
Non-approved qualification	15.8	16.0	14.4	14.7	14.7	14.0	13.6	12.6	15.0	14.5	16.9	19.9	22.8	26.4	25.4	21.1
Foreign language learning	3.8	6.1	5.7	5.7	6.5	7.3	8.8	9.1	9.9	12.6	11.5	11.1	11.4	10.0	9.4	10.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_20

BPDATA

Table 5.21: The distribution of those entering into the training programmes by age groups and educational level

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total number of entrants	45,092	25,760	27,727	26,459	25,353	42,710	37,467	39,780	18,464[a]
By age groups, %									
–20	10.4	9.0	9.7	8.7	7.0	8.1	4.9	3.8	4.0
20–24	24.1	22.3	23.1	23.0	24.7	26.9	25.1	23.9	27.2
25–44	54.7	54.9	52.3	52.0	51.3	48.3	51.5	52.4	46.5
45–49	6.5	7.9	7.8	7.8	8.0	7.0	8.5	8.8	8.3
50+	4.3	5.9	7.1	8.4	9.2	9.7	10.0	11.0	14.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
By level of education, %									
Less than primary school	1.3	1.7	2.3	1.2	1.6	2.1	7.5	3.0	0.7
Primary school	23.1	23.8	26.3	25.1	24.0	28.1	22.8	24.5	28.2
Vocational school	26.9	26.6	25.7	26.8	24.5	21.9	22.0	25.5	24.8
Vocational and technical secondary school	25.7	24.5	23.3	23.5	23.9	22.6	24.8	23.7	24.2
Grammar school	15.5	14.2	14.4	15.0	16.3	15.9	15.3	15.8	15.7
College, university	7.6	9.2	8.1	8.4	9.8	9.4	7.6	7.5	6.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] The drastic decrease in the number of training programs offered was due to the centralization of decision-making regarding the financing of training programs, and the concurrent new requirement according to which only training programs with a verifiable direct effect on employment were approved. Due to these, the number of preventative and general knowledge training programs among those supported decreased. The majority of training participants were enrolled within the framework of EU programs.

Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent05_21

BPDATA

Table 6.1: Nominal and real earnings

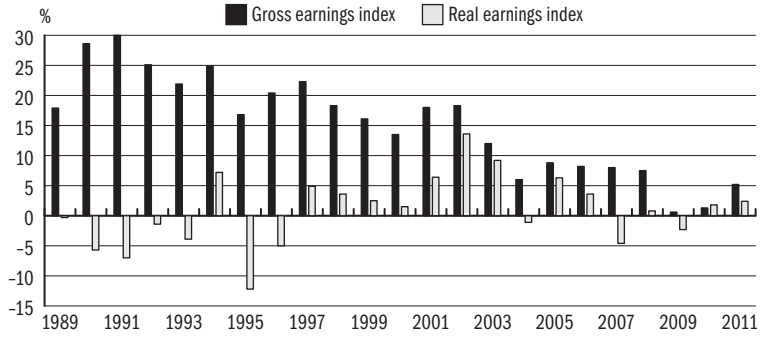
Year	Gross earnings	Net earnings	Gross earnings index	Net earnings index	Consumer price index	Real earnings index
	HUF		previous year = 100			
1989	10,571	8,165	117.9	116.9	117.2	99.7
1990	13,446	10,108	128.6	121.6	128.9	94.3
1991	17,934	12,948	130.0	125.5	135.0	93.0
1992	22,294	15,628	125.1	121.3	123.0	98.6
1993	27,173	18,397	121.9	117.7	122.5	96.1
1994	33,939	23,424	124.9	127.3	118.8	107.2
1995	38,900	25,891	116.8	112.6	128.2	87.8
1996	46,837	30,544	120.4	117.4	123.6	95.0
1997	57,270	38,145	122.3	124.1	118.3	104.9
1998	67,764	45,162	118.3	118.4	114.3	103.6
1999	77,187	50,076	116.1	112.7	110.0	102.5
2000	87,645	55,785	113.5	111.4	109.8	101.5
2001	103,553	64,913	118.0	116.2	109.2	106.4
2002	122,482	77,622	118.3	119.6	105.3	113.6
2003	137,193	88,753	112.0	114.3	104.7	109.2
2004	145,520	93,715	106.0	105.6	106.8	98.9
2005	158,343	103,149	108.8	110.1	103.6	106.3
2006	171,351	110,951	108.2	107.6	103.9	103.6
2007	185,017	114,282	108.0	103.0	108.0	95.4
2008	198,964	122,267	107.5	107.0	106.1	100.8
2009	199,837	124,116	100.6	101.8	104.2	97.7
2010	202,525	132,604	101.3	106.8	104.9	101.8
2011	213,054	141,127	105.2	106.4	103.9	102.4

Source: *KSH IMS* (earnings) and *consumer price accounting* (STADAT, 2012. 03. 26. version).

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent06_01

BPDATA

Figure 6.1: Annual changes of gross and net real earnings



Source: *KSH IMS* (earnings) and *consumer price accounting* (STADAT, 2012. 03. 26. version).

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena06_01

BPDATA

Table 6.2.a: Gross earnings ratios in the economy, HUF/person/month

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Agriculture, forestry and fishing	59,362	72,261	84,542	89,446	97,219	103,190	112,388	122,231	133,570	137,101	143,861	153,300
Mining and quarrying	109,046	124,755	135,770	142,882	158,945	171,465	190,530	202,985	225,650	244,051	233,985	254,607
Manufacturing	88,031	100,964	113,707	123,914	136,354	145,997	158,597	172,277	183,081	190,331	200,748	213,145
Electricity, gas, steam and air conditioning supply	133,658	153,100	176,269	198,733	223,541	243,039	265,912	294,241	321,569	345,035	363,900	379,711
Water supply; sewerage, waste management and remediation activities	83,938	95,214	108,585	119,341	129,486	140,699	151,912	164,572	178,049	181,818	193,605	207,614
Construction	64,288	79,368	86,324	94,193	100,124	106,608	117,626	136,301	146,475	152,204	153,003	156,574
Wholesale and retail trade; repair of motor vehicles and motorcycles	78,417	91,303	106,709	115,922	122,538	131,068	145,243	158,077	171,780	175,207	185,695	196,953
Transportation and storage	87,473	100,148	112,577	124,419	137,526	149,068	162,091	173,776	186,376	196,350	200,111	210,146
Accommodation and food service activities	55,276	66,358	77,756	87,115	90,089	95,823	102,908	112,222	120,600	122,561	122,691	125,757
Information and communication	169,984	203,466	234,040	250,308	273,606	288,876	306,792	328,902	358,217	366,752	368,115	392,974
Financial and insurance activities	189,818	217,018	241,654	274,081	324,295	349,809	401,580	390,511	431,601	427,508	433,442	456,942
Real estate activities	89,468	94,671	111,627	122,087	126,388	134,409	145,550	159,225	169,845	177,747	182,747	184,829
Professional, scientific and technical activities	110,626	136,522	149,544	167,758	182,970	200,830	212,963	244,998	281,150	292,974	297,559	303,365
Administrative and support service activities	73,108	89,575	102,693	107,250	113,276	119,555	128,486	139,127	147,125	149,131	145,574	149,690
Public administration and defence; compulsory social security	104,288	131,731	167,856	180,866	184,357	207,356	223,009	253,335	267,657	234,696	243,401	252,848
Education	81,160	97,580	128,536	162,293	159,803	181,444	191,211	193,250	204,600	194,958	195,928	192,984
Human health and social work activities	68,372	78,796	103,149	129,995	130,509	144,100	151,889	160,050	169,977	161,265	142,337	153,832
Arts, entertainment and recreation	75,318	87,630	112,894	137,826	141,957	154,312	161,416	183,898	183,813	179,199	179,981	192,407
Other service activities	66,946	80,752	91,198	103,554	127,136	133,846	140,893	153,512	157,950	160,375	150,045	162,093
National economy, total	87,750	103,554	122,481	137,193	145,523	158,343	171,351	185,018	198,741	199,837	202,576	213,054
Of which:												
Business sector	88,424	102,834	116,596	127,032	138,926	148,555	162,531	177,415	192,044	200,304	206,848	217,878
Budgetary institutions	86,573	105,944	136,844	160,844	161,559	182,185	193,949	206,225	219,044	201,632	196,186	203,516

Note: The data are recalculated based on the industrial classification system in effect from 2008.
Source: *KSH* mid-year IMS.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent06_02a

Table 6.2.b: Gross earnings ratios in the economy, per cent

BPDATA

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Agriculture, forestry and fishing	67.6	69.8	69.0	65.2	66.8	65.2	65.6	66.1	67.2	68.6	71.0	72.0
Mining and quarrying	124.3	120.5	110.8	104.1	109.2	108.3	111.2	109.7	113.5	122.1	115.5	119.5
Manufacturing	100.3	97.5	92.8	90.3	93.7	92.2	92.6	93.1	92.1	95.2	99.1	100.0
Electricity, gas, steam and air conditioning supply	152.3	147.8	143.9	144.9	153.6	153.5	155.2	159.0	161.8	172.7	179.6	178.2
Water supply; sewerage, waste management and remediation activities	95.7	91.9	88.7	87.0	89.0	88.9	88.7	88.9	89.6	91.0	95.6	97.4
Construction	73.3	76.6	70.5	68.7	68.8	67.3	68.6	73.7	73.7	76.2	75.5	73.5
Wholesale and retail trade; repair of motor vehicles and motorcycles	89.4	88.2	87.1	84.5	84.2	82.8	84.8	85.4	86.4	87.7	91.7	92.4
Transportation and storage	99.7	96.7	91.9	90.7	94.5	94.1	94.6	93.9	93.8	98.3	98.9	98.6
Accommodation and food service activities	63.0	64.1	63.5	63.5	61.9	60.5	60.1	60.7	60.7	61.3	60.6	59.0
Information and communication	193.7	196.5	191.1	182.4	188.0	182.4	179.0	177.8	180.2	183.5	181.7	184.4
Financial and insurance activities	216.3	209.6	197.3	199.8	222.8	220.9	234.4	211.1	217.2	213.9	214.0	214.5
Real estate activities	102.0	91.4	91.1	89.0	86.9	84.9	84.9	86.1	85.5	88.9	90.2	86.8
Professional, scientific and technical activities	126.1	131.8	122.1	122.3	125.7	126.8	124.3	132.4	141.5	146.6	146.9	142.4
Administrative and support service activities	83.3	86.5	83.8	78.2	77.8	75.5	75.0	75.2	74.0	74.6	71.9	70.3
Public administration and defence; compulsory social security	118.8	127.2	137.0	131.8	126.7	131.0	130.1	136.9	134.7	117.4	120.2	118.7
Education	92.5	94.2	104.9	118.3	109.8	114.6	111.6	104.4	102.9	97.6	96.7	90.6
Human health and social work activities	77.9	76.1	84.2	94.8	89.7	91.0	88.6	86.5	85.5	80.7	70.3	72.2
Arts, entertainment and recreation	85.8	84.6	92.2	100.5	97.5	97.5	94.2	99.4	92.5	89.7	88.8	90.3
Other service activities	76.3	78.0	74.5	75.5	87.4	84.5	82.2	83.0	79.5	80.3	74.1	76.1
National economy, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Of which:												
Business sector	100.8	99.3	95.2	92.6	95.5	93.8	94.9	95.9	96.6	100.2	102.1	102.3
Budgetary institutions	98.7	102.3	111.7	117.2	111.0	115.1	113.2	111.5	110.2	100.9	96.8	95.5

Note: The data are recalculated based on the industrial classification system in effect from 2008.
Source: *KSH* mid-year IMS.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent06_02b

BPDATA

Table 6.3: Regression-adjusted earnings differentials

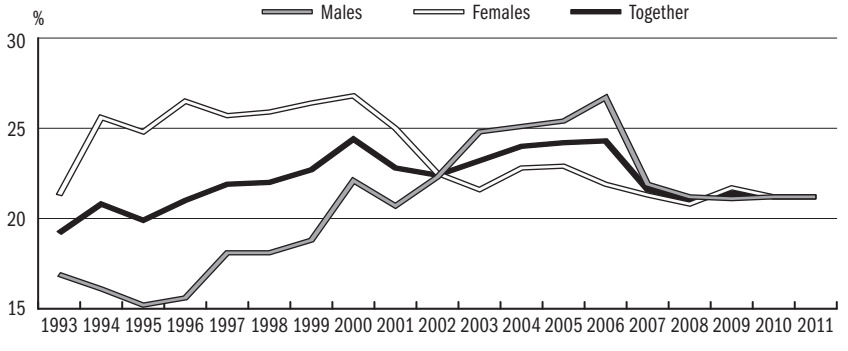
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Male	0.1600	0.1620	0.1410	0.1480	0.1490	0.1500	0.1520	0.1810	0.1720	0.1480	0.1470	0.1540
Less than primary school	–0.5740	–0.4870	–0.4550	–0.4110	–0.3900	–0.4800	–0.4090	–0.4350	–0.4030	–0.5650	–0.3770	–0.5270
Primary school	–0.4120	–0.3650	–0.3640	–0.3550	–0.3670	–0.3730	–0.3830	–0.4160	–0.4050	–0.4480	–0.3760	–0.4180
Vocational school	–0.2780	–0.2530	–0.2730	–0.2550	–0.2650	–0.2750	–0.2840	–0.2940	–0.2800	–0.3000	–0.2460	–0.2610
College, university	0.5570	0.5310	0.5400	0.6190	0.5870	0.5900	0.5790	0.5620	0.5560	0.6180	0.5760	0.6190
Estimated labour market experience	0.0250	0.0212	0.0213	0.0216	0.0237	0.0238	0.0254	0.0256	0.0250	0.0261	0.0230	0.0256
Square of estimated labour market experience	–0.0004	–0.0003	–0.0003	–0.0003	–0.0004	–0.0004	–0.0004	–0.0004	–0.0004	–0.0004	–0.0004	–0.0004
Public sector	–0.1230	–0.1140	–0.0581	0.1120	0.1600	0.1130	0.0918	0.0031	0.0224	–0.1270	–0.0589	–0.1690

Note: the results indicate the earnings differentials of the various groups relative to the reference group in log points (approximately percentage points). All parameters are significant at the 0.01 level. The region parameters can be seen in Table 9.6.
Reference categories: female, with leaving certificate (general education certificate), not in the public sector, working in the Central-Transdanubia region.
Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent06_03

BPDATA

Figure 6.2: The percentage of low paid workers by gender, per cent



Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena06_02

Table 6.4: Percentage of low paid workers[a] by gender, age groups, level of education and industries

BPDATA

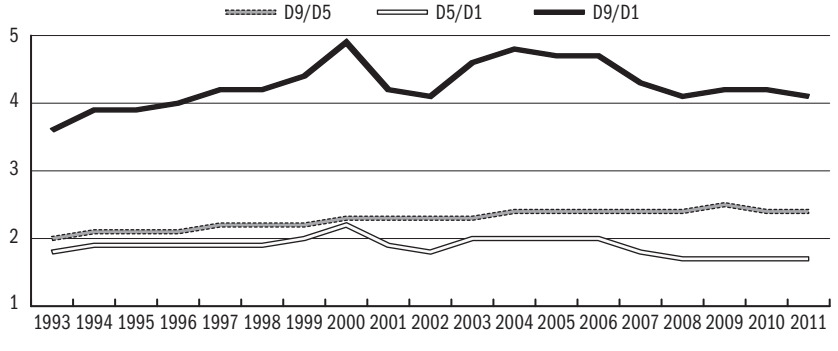
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
By gender															
Males	18.1	18.1	18.8	22.1	20.7	22.3	24.8	25.1	25.4	26.7	21.9	21.2	21.1	21.2	21.2
Females	25.7	25.9	26.4	26.8	25.0	22.5	21.6	22.8	22.9	21.9	21.3	20.8	21.7	21.2	21.2
By age groups															
-24	39.1	37.7	37.9	37.0	35.5	37.6	39.9	43.9	44.2	46.3	40.1	34.6	38.9	38.2	38.2
25-54	20.2	20.6	21.3	22.8	21.9	21.8	22.3	23.6	24.0	24.2	21.4	20.6	21.0	20.9	20.9
55+	11.8	12.7	17.2	19.8	18.1	16.2	15.3	16.5	16.5	16.4	15.8	15.5	17.6	18.1	18.1
By level of education															
8 grades of primary school or less	40.6	42.9	43.9	43.4	40.4	38.3	37.1	39.6	41.2	40.1	41.4	41.3	47.4	43.4	43.4
Vocational school	27.0	26.9	28.6	31.2	29.4	32.1	35.4	35.7	36.8	37.9	32.9	32.1	33.5	33.3	33.3
Secondary school	14.0	14.2	15.4	18.8	18.0	16.5	17.7	18.6	18.6	19.7	16.1	15.4	16.4	17.3	17.3
Higher education	3.0	3.4	3.2	4.7	4.7	3.6	3.5	3.9	3.8	4.3	2.5	2.4	2.3	2.9	2.9
By industries[b]															
Agriculture, forestry, fishing	36.7	36.7	38.1	38.0	34.3	37.9	37.3	37.1	37.5	41.6	37.9	36.6	36.7	34.6	34.6
Manufacturing	18.5	18.9	18.9	20.0	19.1	19.4	25.4	24.7	22.1	24.1	20.8	23.5	23.0	20.5	20.5
Construction	32.7	32.6	36.7	42.9	41.7	44.8	49.8	51.2	50.2	55.2	43.1	37.5	38.1	43.0	43.0
Trade, repairing	36.0	37.7	36.8	42.8	41.3	44.0	49.0	49.3	51.5	49.4	40.9	35.9	35.2	36.4	36.4
Transport, storage, communication	8.8	8.8	9.0	11.3	10.6	10.5	13.6	12.6	13.8	15.1	13.2	14.6	11.2	13.3	13.3
Financial intermediation	19.9	19.9	21.1	25.3	22.6	20.7	23.1	23.9	24.6	26.2	20.9	20.0	20.5	20.7	20.7
Public administration and defence, compulsory social security	19.0	15.5	16.0	13.7	13.8	9.3	6.6	8.2	6.0	6.3	7.4	6.7	8.7	8.8	8.8
Education	21.7	23.2	23.8	21.5	22.6	16.0	4.8	6.9	8.8	6.1	9.0	7.2	11.9	10.6	10.6
Health and social work	24.1	25.8	28.0	26.7	19.9	16.1	6.3	8.4	10.3	8.6	12.6	11.1	14.5	13.8	13.8
Total	21.9	22.0	22.7	24.4	22.8	22.4	23.2	24.0	24.2	24.3	21.6	21.0	21.4	21.2	21.2

[a] Percentage of those who earn less than 2/3 of the median earning.
[b] 1997–2008: by TEÁOR'03, 2009: by TEÁOR'08.
Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent06_04

BPDATA

Figure 6.3: The dispersion of gross monthly earnings

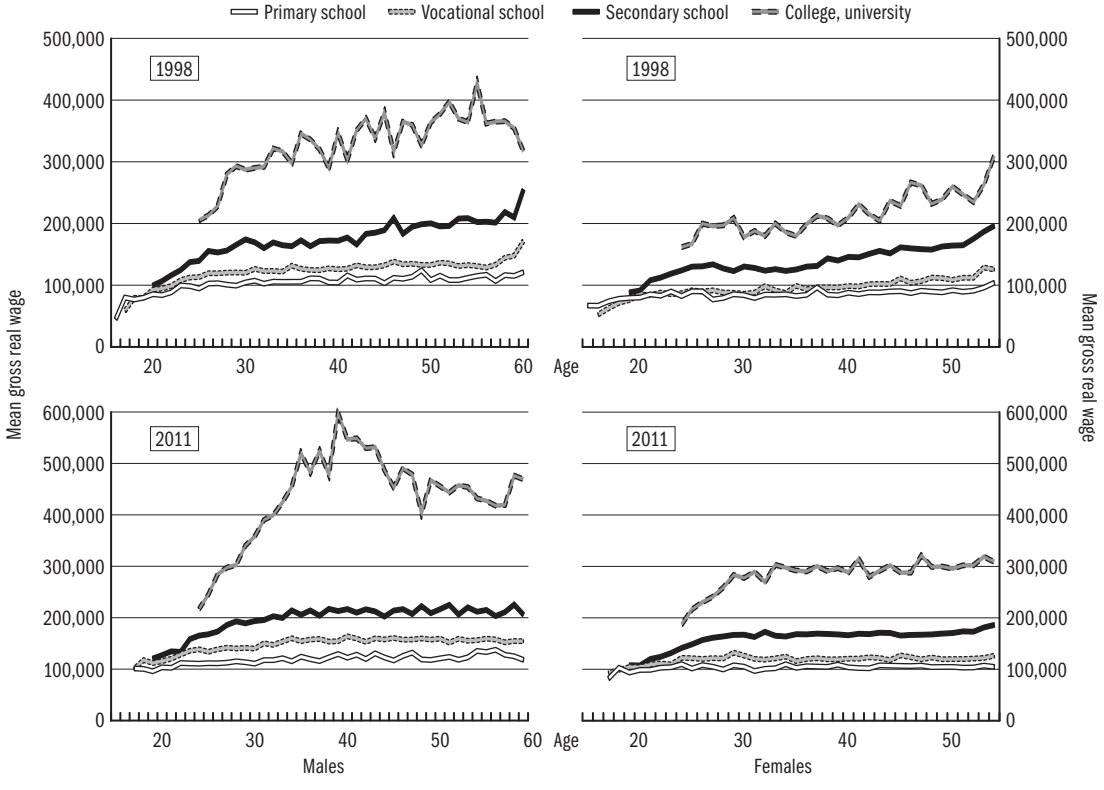


Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena06_03

BPDATA

Figure 6.4: Age-income profiles by education level in 1998 and 2011, women and men

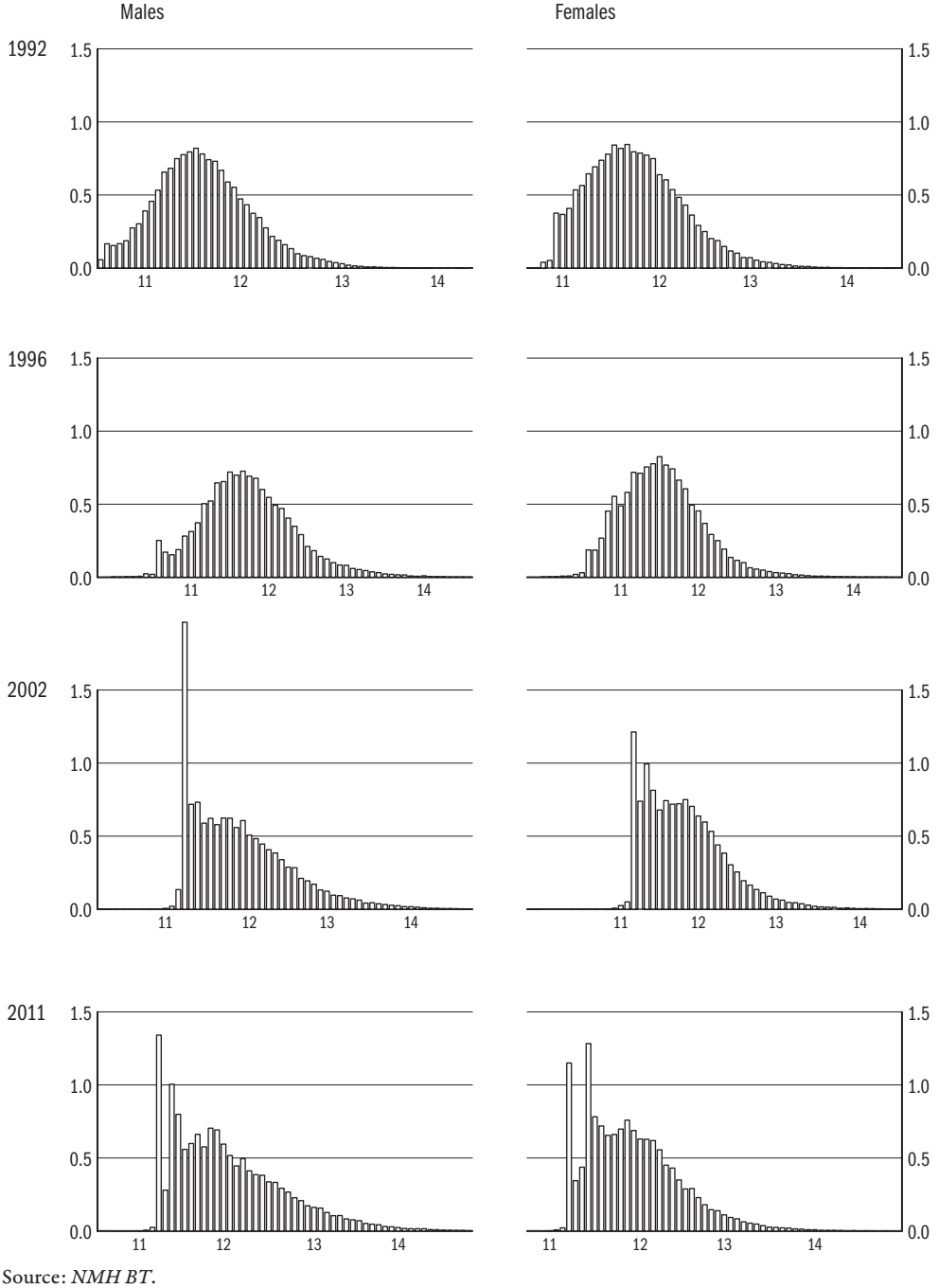


Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena06_04

BPDATA

Figure 6.5: The dispersion of the logarithm of gross real earnings (2011 = 100%)



Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena06_05

BPDATA

Table 7.1: School-leavers by level of education

Year	Primary school	Vocational school	Secondary school	College, university
1980	119,809	49,232	43,167	14,859
1989	170,891	53,724	52,573	15,699
1990	164,614	54,933	53,039	15,963
1991	158,907	59,302	54,248	16,458
1992	151,287	66,261	59,646	16,201
1993	144,200	66,342	68,607	16,223
1994	136,857	62,902	68,604	18,041
1995	122,333	57,057	70,265	20,024
1996	120,529	54,209	73,413	22,128
1997	116,708	46,868	75,564	24,411
1998	113,651	42,866	77,660	25,338
1999	114,302	38,822	73,965	27,049
2000	114,250	35,500[a]	72,200[a]	29,843[a]
2001	114,200[a]	33,500[a]	70,441	29,746
2002	113,923	26,941	69,612	30,785
2003	117,747	26,472	71,944	31,911
2004	113,179	26,620	76,669	31,633
2005	115,626	25,519	77,025	32,732
2006	114,240	24,427	76,895	29,871
2007	108,889	17,967	77,527	29,059
2008	106,426	19,289	68,453	28,957
2009	102,798	20,138	78,004	36,064
2010	103,643	20,693	77,930	38,456
2011	96,825	20,720	76,354	35,433

[a] Estimated data.

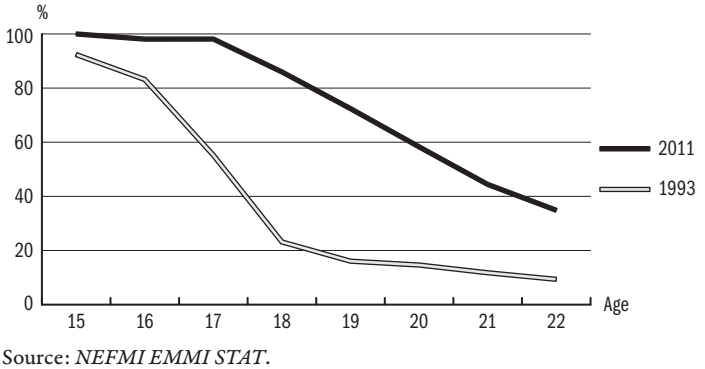
Note: Primary school: completed the 8th grade. Other levels: received certificate. Excludes special schools. College, university: from 2007 includes those completing basic higher education, combined, and masters programs.

Source: *NEFMI EMMI STAT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent07_01

BPDATA

Figure 7.1: Full time studens as a percentage of the different age groups



Source: *NEFMI EMMI STAT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena07_01

Table 7.2: Pupils/students entering the school system by level of education

BPDATA

Year	Primary school	Vocational school	Secondary school	College, university
1980	171,347	60,865	57,213	17,886
1990	125,665	87,932	83,939	22,662
1995	123,997	65,352	82,665	42,433
1996	124,554	58,822	84,773	44,698
1997	127,214	53,083	84,395	45,669
1998	125,875	39,965	86,868	48,886
1999	121,424	33,570	89,184	51,586
2000	117,000	33,900[a]	90,800[a]	54,100[a]
2001	112,144	34,210	92,393	56,709
2002	112,345	33,497	94,256	57,763
2003	114,020	33,394	92,817	59,699
2004	101,021	32,645	93,469	59,783
2005	97,810	33,114	96,181	61,898
2006	95,954	32,732	95,989	61,231
2007	98,766	31,897	92,957	55,789
2008	97,345	32,774	90,667	52,755
2009	97,083	34,177	87,731	61,948
2010	95,469	35,177	88,644	68,715
2011	96,455	35,420	83,025	70,954

[a] Estimated data.

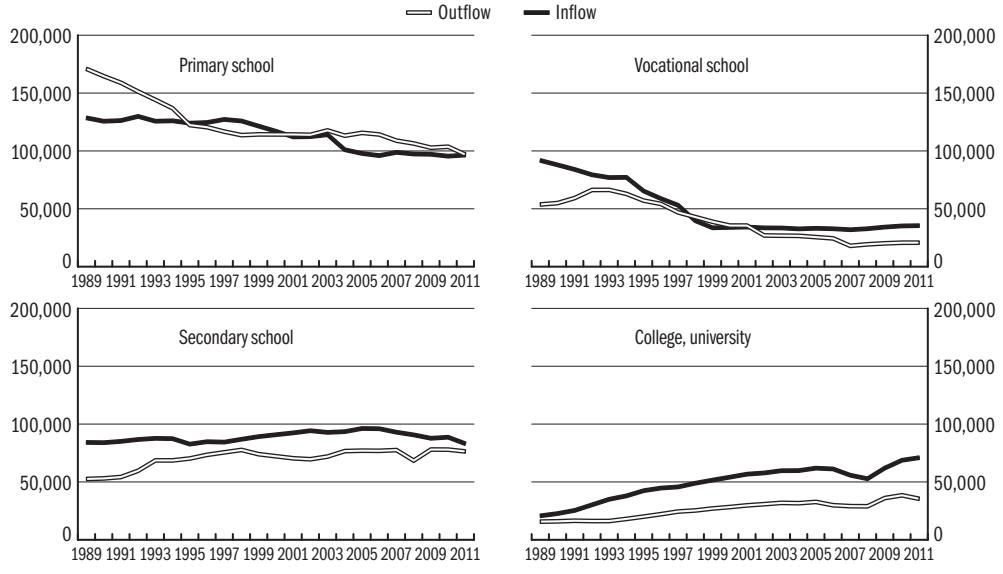
Source: *NEFMI EMMI STAT*.

Note: Primary school: completed the 8th grade. Other levels: received certificate. Excludes special schools. College, university: from the 2005/2006 school-year, includes those completing basic higher education, combined, and masters programs.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent07_02

Figure 7.2: Flows of the educational system by level

BPDATA



Source: *NEFMI EMMI STAT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena07_02

BPDATA

Table 7.3: The number of full time pupils/students by level of education

Year	Primary school	Vocational school	Secondary school	College, university
1990/91	1,130,656	222,204	291,872	76,601
1997/98	963,997	143,911	368,645	152,889
1998/99	964,248	128,203	376,626	163,100
1999/00	960,601	117,038	386,579	171,612
2001/02	905,932	124,615	420,889	184,071
2002/03	893,261	123,069	426,384	193,155
2003/04	874,296	123,206	437,909	204,910
2004/05	854,930	123,008	438,496	212,292
2005/06	828,594	121,815	441,002	217,245
2006/07	800,635	119,520	443,166	224,616
2007/08	783,948	122,973	441,886	227,118
2008/09	765,822	123,640	439,957	224,894
2009/10	752,896	128,479	443,078	222,564
2010/11	736,977	129,076	438,892	218,057
2011/12	729,000	129,250	428,122	218,304

Note: Excludes special education schools. Beginning with the 2001/2002 schoolyear, students in grades 5-8 who attend a 6 or 8 year high school are included in the number of high school students. The reason for the missing data in 2000/01 is that the NEFMI was unable to carry out the analysis based in the source data due to technical difficulties. College, university: from the 2005/2006 schoolyear, includes those completing basic higher education, combined, and masters programs.
Source: *NEFMI EMMI STAT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent07_03

BPDATA

Table 7.4: The number of pupils/students not in full time by level of education

Year	Primary school	Vocational school	Secondary school	College, university
1990/91	11,536	–	68,162	25,786
1997/98	3,165	–	78,292	80,768
1998/99	3,016	–	84,862	95,215
1999/00	3,146	–	88,462	107,385
2000/01	2,940	1,070	91,700	118,994
2001/02	2,793	2,453	95,231	129,167
2002/03	2,785	3,427	93,172	148,032
2003/04	3,190	3,216	93,322	162,037
2004/05	2,766	3,505	90,321	166,174
2005/06	2,543	4,049	89,950	163,387
2006/07	2,319	4,829	91,035	151,203
2007/08	2,245	5,874	83,008	132,273
2008/09	2,083	4,983	74,008	115,957
2009/10	2,035	6,594	70,124	105,511
2010/11	1,997	8,068	76,404	99,962
2011/12	2,264	10,383	74,204	98,081

Note: College, university: from the 2005/2006 schoolyear, includes those completing basic higher education, combined, and masters programs.
Source: *NEFMI EMMI STAT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent07_04

BPDATA

Table 7.5: Number of high school applicants, full time

Year	Applied	Admitted	Admitted as a percentage of applied	Applied as a percentage of the secondary school graduates in the given year	Admitted as a percentage of the secondary school graduates in the given year
1980	33,339	14,796	44.4	77.2	34.3
1989	44,138	15,420	34.9	84.0	29.3
1990	46,767	16,818	36.0	88.2	31.7
1991	48,911	20,338	41.6	90.2	37.5
1992	59,119	24,022	40.6	99.1	40.3
1993	71,741	28,217	39.3	104.6	41.1
1994	79,805	29,901	37.5	116.3	43.6
1995	86,548	35,081	40.5	123.2	49.9
1996	79,369	38,382	48.4	108.1	52.3
1997	81,924	40,355	49.3	108.4	53.4
1998	81,065	43,629	53.8	104.4	56.2
1999	82,815	44,538	53.8	112.0	60.2
2000	82,957	45,546	54.9	114.9	63.1
2001	84,380	49,874	59.1	119.8	70.8
2002	88,978	52,552	59.1	127.8	75.5
2003	87,110	52,703	60.5	121.1	73.3
2004	95,871	55,179	57.6	125.0	72.0
2005	91,583	52,863	57.7	118.9	68.6
2006	84,262	53,983	64.1	109.6	70.2
2007	74,849	50,941	68.1	96.5	65.7
2008	66,963	52,081	77.8	97.8	76.1
2009	90,878	61,262	67.4	116.5	78.5
2010	100,777	65,503	65.0	129.3	84.1
2011	101,835	66,810	65.6	133.4	87.5

Note: Including those applying to and accepted to basic higher education, combined, and masters programs. From 2008, includes the number of those accepted during late and cross-semester admissions.
Source: *NEFMI EMMI STAT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent07_05

BPDATA

Table 8.1: The number of vacancies[a] reported to the local offices of the NFSZ

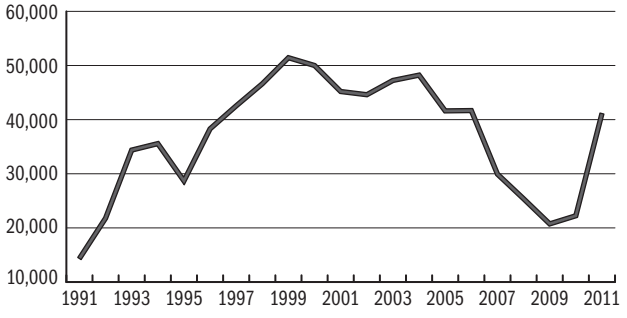
Year	Number of vacancies at closing day	Number of registered unemployed[b] at closing date	Vacancies per 100 registered unemployed[b]
1991	14,343	227,270	6.3
1992	21,793	556,965	3.9
1993	34,375	671,745	5.1
1994	35,569	568,366	6.3
1995	28,680	507,695	5.6
1996	38,297	500,622	7.6
1997	42,544	470,112	9.0
1998	46,624	423,121	11.0
1999	51,438	409,519	12.6
2000	50,000	390,492	12.8
2001	45,194	364,140	12.4
2002	44,603	344,715	12.9
2003	47,239	357,212	13.2
2004	48,223	375,950	12.8
2005	41,615	409,929	10.2
2006	41,677	393,465	10.6
2007	29,933	426,915	7.0
2008	25,386	442,333	5.7
2009	20,739	561,768	3.7
2010	22,241	582,664	3.8
2011	41,123	582,868	7.1

[a] Monthly average stock figures.
[b] Since 1st of November, 2005: registered jobseekers.
Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent08_01

BPDATA

Figure 8.1: The number of vacancies reported to the local offices of the NFSZ



Source: *NFSZ*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena08_01

BPDATA

Table 8.2: Firms intending to increase/decrease their staff[a], per cent

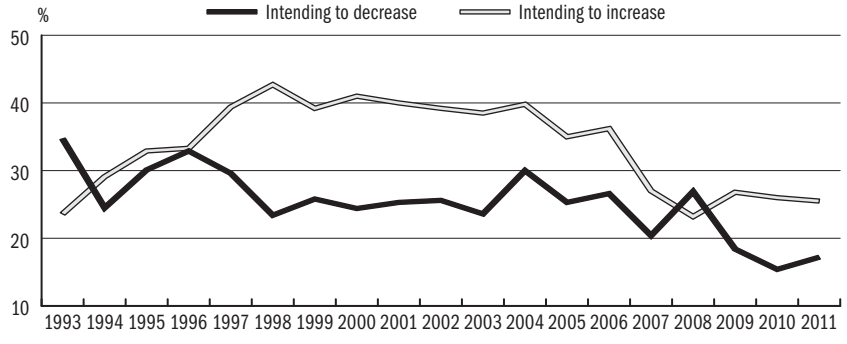
Year		Intending to decrease	Intending to increase	Year		Intending to decrease	Intending to increase
1993	I.	34.7	23.6	2001	I.	25.3	40.0
	II.	28.5	22.3		II.	28.6	32.6
1994	I.	24.5	29.1	2002	I.	25.6	39.2
	II.	21.0	29.7		II.	27.9	35.4
1995	I.	30.1	32.9	2003	I.	23.6	38.5
	II.	30.9	27.5		II.	32.1	34.3
1996	I.	32.9	33.3	2004		30.0	39.8
	II.	29.4	30.4	2005		25.3	35.0
1997	I.	29.6	39.4	2006		26.6	36.2
	II.	30.7	36.8	2007		20.4	27.0
1998	I.	23.4	42.7	2008		26.9	23.2
	II.	28.9	37.1	2009		18.4	26.8
1999	I.	25.8	39.2	2010		15.4	26.0
	II.	28.8	35.8	2011		17.2	25.5
2000	I.	24.4	41.0				
	II.	27.2	36.5				

[a] In the period of the next half year after the interview date, in the sample of NMH PROG, since 2004: 1 year later from the interview date.
Source: *NMH PROG.*

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent08_02

BPDATA

Figure 8.2: Firms intending to increase/decrease their staff



Source: *NMH PROG.*

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena08_02

BPDATA

Table 9.1: Regional inequalities: Employment rate[a]

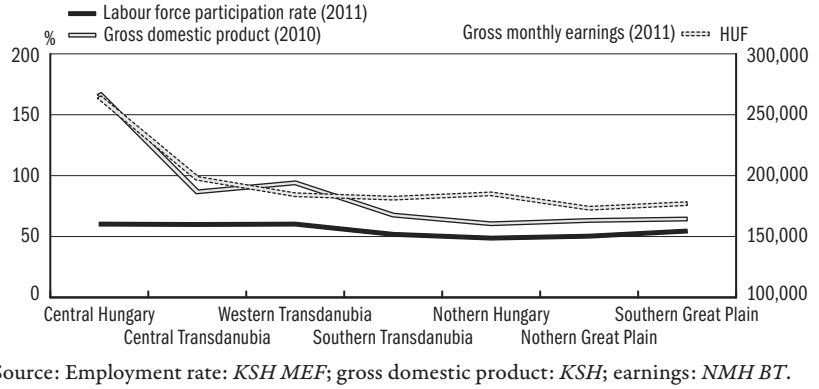
Year	Central Hungary	Central Transdanubia	Western Transdanubia	Southern Transdanubia	Northern Hungary	Northern Great Plain	Southern Great Plain	Total
1992	62.3	57.7	62.0	57.2	52.2	52.5	57.9	58.0
1993	58.4	55.2	60.5	52.9	49.3	48.4	53.4	54.5
1994	57.2	54.4	59.9	52.4	47.7	47.5	53.0	53.5
1995	57.1	53.1	58.5	48.8	46.3	46.4	53.0	52.5
1996	56.8	52.7	59.3	50.3	45.7	45.6	52.8	52.4
1997	56.8	53.6	59.8	50.0	45.7	45.2	53.6	52.5
1998	57.7	56.0	61.6	51.5	46.2	46.4	54.2	53.7
1999	59.7	58.5	63.1	52.8	48.1	48.8	55.3	55.6
2000	60.5	59.2	63.4	53.5	49.4	49.0	56.0	56.3
2001	60.6	59.3	63.1	52.3	49.7	49.5	55.8	56.2
2002	60.9	60.0	63.7	51.6	50.3	49.3	54.2	56.2
2003	61.7	62.3	61.9	53.4	51.2	51.6	53.2	57.0
2004	62.9	60.3	61.4	52.3	50.6	50.4	53.6	56.8
2005	63.3	60.2	62.0	53.4	49.5	50.2	53.8	56.9
2006	62.7	61.4	62.8	53.6	50.4	51.1	54.3	57.3
2007	62.7	61.8	63.4	51.2	50.8	50.5	55.2	57.3
2008	62.7	60.3	62.1	51.0	49.5	49.9	54.5	56.7
2009	61.6	57.8	59.7	52.1	48.6	48.1	53.2	55.4
2010	60.3	57.3	59.0	53.1	48.7	49.3	54.4	55.4
2011	60.2	59.9	60.2	51.8	48.7	50.3	54.5	55.8

[a] Age: 15–64.
Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent09_01

BPDATA

Figure 9.1: Regional inequalities: Labour force participation rates, gross monthly earnings and gross domestic product in NUTS-2 level regions



Source: Employment rate: *KSH MEF*; gross domestic product: *KSH*; earnings: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena09_01

BPDATA

Table 9.2: Regional inequalities: LFS-based unemployment rate[a]

Year	Central Hungary	Central Transdanubia	Western Transdanubia	Southern Transdanubia	Northern Hungary	Northern Great Plain	Southern Great Plain	Total
1997	7.0	8.1	6.0	9.9	14.0	12.0	7.3	8.8
1998	5.7	6.8	6.1	9.4	12.2	11.1	7.1	7.8
1999	5.2	6.1	4.4	8.3	11.6	10.2	5.8	7.0
2000	5.3	4.9	4.2	7.8	10.1	9.3	5.1	6.4
2001	4.3	4.3	4.1	7.7	8.5	7.8	5.4	5.7
2002	3.9	5.0	4.0	7.9	8.8	7.8	6.2	5.8
2003	4.0	4.6	4.6	7.9	9.7	6.8	6.5	5.9
2004	4.5	5.6	4.6	7.3	9.7	7.2	6.3	6.1
2005	5.2	6.3	5.9	8.8	10.6	9.1	8.2	7.2
2006	5.1	6.1	5.7	9.0	11.0	10.9	7.8	7.5
2007	4.7	5.0	5.0	10.0	12.3	10.8	7.9	7.4
2008	4.6	5.8	5.0	10.3	13.4	12.0	8.8	7.8
2009	6.6	9.3	8.6	11.0	15.2	14.2	10.9	10.0
2010	8.9	10.3	9.2	12.1	16.0	14.5	10.6	11.2
2011	8.8	9.3	7.4	12.7	16.7	14.5	10.6	10.9

[a] Age: 15–74.
Note: Up to 2000 data are weighted on the basis of the 1990 Population Census.
Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent09_02

BPDATA

Table 9.3: Regional differences: The share of registered unemployed[a] relative to the economically active population[b], per cent

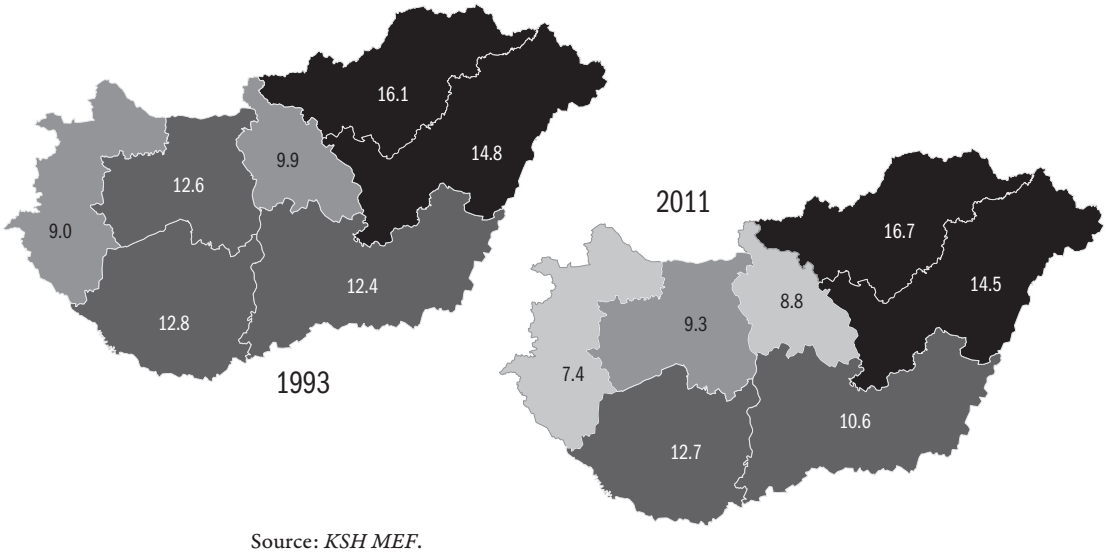
Year	Central Hungary	Central Transdanubia	Western Transdanubia	Southern Transdanubia	Northern Hungary	Northern Great Plain	Southern Great Plain	Total
1997	5.6	9.9	7.3	13.1	16.8	16.4	11.0	10.5
1998	4.7	8.6	6.1	11.8	16.0	15.0	10.1	9.5
1999	4.5	8.7	5.9	12.1	17.1	16.1	10.4	9.7
2000	3.8	7.5	5.6	11.8	17.2	16.0	10.4	9.3
2001	3.2	6.7	5.0	11.2	16.0	14.5	9.7	8.5
2002	2.8	6.6	4.9	11.0	15.6	13.3	9.2	8.0
2003	2.8	6.7	5.2	11.7	16.2	14.1	9.7	8.3
2004	3.2	6.9	5.8	12.2	15.7	14.1	10.4	8.7
2005	3.4	7.4	6.9	13.4	16.5	15.1	11.2	9.4
2006	3.1	7.0	6.3	13.0	15.9	15.0	10.7	9.0
2007	3.5	6.9	6.3	13.6	17.6	16.6	11.7	9.7
2008	3.6	7.1	6.3	14.3	17.8	17.5	11.9	10.0
2009	5.4	11.5	9.5	17.8	20.9	20.2	14.4	12.8
2010	6.6	11.8	9.3	17.1	21.5	20.9	15.2	13.3
2011	6.8	10.9	8.0	16.6	21.5	22.0	14.5	13.2

[a] Since 1st of November, 2005: the ratio of registered jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployed to registered jobseekers.
[b] The denominator of the ratio is the economically active population on January 1st of the previous year.
Source: *NFSZ REG*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent09_03

BPDATA

Figure 9.2: Regional inequalities: LFS-based unemployment rates in NUTS-2 level regions

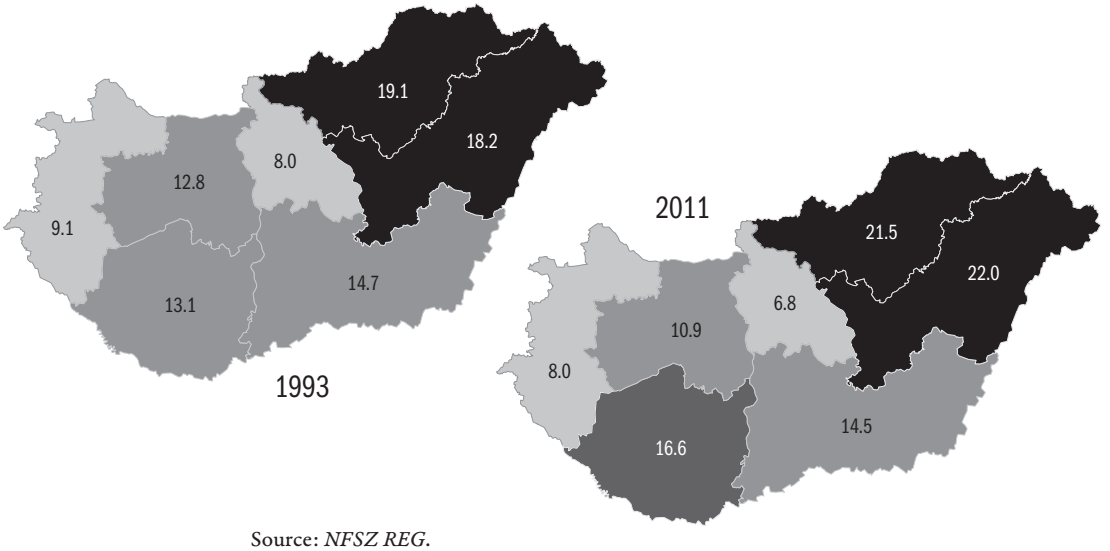


Source: *KSH MEF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena09_02

BPDATA

Figure 9.3: Regional inequalities: The share of registered unemployed relative to the economically active population, per cent, in NUTS-2 level regions



Source: *NFSZ REG*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena09_03

Table 9.4: Annual average registered unemployment rate[a] by counties, per cent

BPDATA

County	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Budapest	0.1	5.7	5.7	4.8	4.0	3.7	3.0	2.6	2.2	2.4	2.8	2.9	2.6	3.0	3.1	4.6	5.9	6.2
Baranya	1.1	11.8	12.2	13.3	11.8	11.6	11.6	11.1	11.2	11.9	11.6	13.4	13.3	12.9	13.6	14.7	17.1	16.6
Bács-Kiskun	1.1	11.0	10.9	10.7	9.7	10.0	10.0	9.3	8.8	9.4	9.9	10.4	10.2	11.4	12.0	17.9	15.6	14.8
Békés	1.1	14.0	14.0	13.5	13.0	13.0	13.1	11.9	11.2	11.5	12.0	13.0	13.5	15.0	14.8	17.3	18.1	17.8
Borsod-Abaúj-Zemplén	2.3	16.7	18.0	19.0	17.9	19.5	20.3	19.0	19.1	19.6	18.3	18.9	18.0	19.9	20.1	23.1	23.7	23.5
Csongrád	1.0	9.9	9.3	9.2	8.1	8.5	8.6	8.3	8.1	8.5	9.7	10.7	8.8	9.2	9.3	11.6	12.4	11.5
Fejér	1.0	10.6	10.4	9.4	8.4	8.3	7.2	6.4	6.4	7.1	7.3	7.4	7.3	7.1	7.5	11.5	12.4	12.1
Győr-Moson-Sopron	0.5	6.8	7.4	6.4	5.1	4.8	4.6	4.1	4.0	4.1	4.6	5.4	4.6	4.1	4.1	6.9	6.8	5.7
Hajdú-Bihar	0.9	14.2	15.6	15.0	14.0	15.6	14.7	13.6	12.8	13.1	12.9	14.0	13.9	15.6	16.5	19.1	20.3	20.7
Heves	1.6	12.5	13.6	12.1	11.7	12.3	12.0	10.6	9.8	10.0	10.6	11.3	11.1	12.2	12.7	15.8	16.1	16.1
Jász-Nagykun-Szolnok	1.6	14.6	14.8	14.8	13.5	13.7	13.4	11.5	10.2	10.7	11.2	12.0	11.4	11.8	12.2	15.5	16.4	18.1
Komárom-Esztergom	1.0	11.3	12.0	11.4	9.8	10.1	8.3	7.0	6.7	6.0	5.8	6.8	5.8	5.4	5.5	10.2	10.4	9.5
Nógrád	2.4	16.3	17.0	16.3	15.6	16.2	14.9	14.3	13.8	14.6	14.6	16.1	16.1	17.7	17.8	21.2	22.0	22.9
Pest	0.5	7.6	7.8	7.3	6.3	6.0	5.2	4.4	3.7	3.7	3.8	4.2	3.9	4.3	4.4	6.7	7.7	7.6
Somogy	1.4	11.2	12.5	12.7	11.3	12.2	11.9	11.6	11.5	12.2	13.4	14.5	14.6	16.2	16.9	19.4	18.9	18.3
Szabolcs-Szatmár-Bereg	2.6	19.3	19.7	18.9	17.2	18.7	19.5	17.8	16.7	17.7	17.5	18.6	18.8	21.0	22.4	24.7	24.8	26.0
Tolna	1.6	12.2	13.4	13.5	12.3	12.9	11.8	11.0	10.0	10.7	11.6	11.8	10.5	11.5	12.1	15.2	14.7	14.2
Vas	0.4	7.2	7.2	6.7	5.6	5.6	5.2	4.9	4.5	5.0	6.0	6.8	6.1	6.2	6.1	9.8	9.6	7.7
Veszprém	0.9	10.0	9.9	9.2	7.9	8.2	7.2	6.9	6.6	7.0	7.3	8.0	7.7	8.0	8.2	12.6	12.3	10.8
Zala	0.8	9.2	9.8	9.2	8.1	7.7	7.2	6.5	6.4	7.0	7.4	9.3	9.0	9.3	9.4	13.0	12.9	11.7
Total	1.0	10.6	11.0	10.5	9.5	9.7	9.3	8.5	8.0	8.3	8.7	9.4	9.0	9.7	10.0	12.8	13.3	13.2

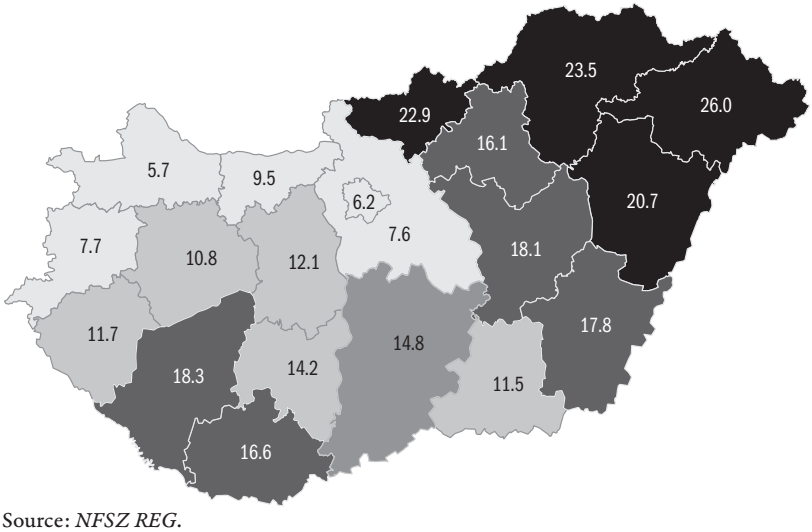
[a] Since 1st of November, 2005: the ratio of registered jobseekers. From the 1st of November, 2005 the Employment Act changed the definition of registered unemployed to registered jobseekers. The denominator of the ratio is the economically active population on January 1st of the previous year.

Source: *NFSZ REG.*

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent09_04

Figure 9.4: Regional inequalities: Means of registered unemployment rates in the counties, 2011

BPDATA



Source: *NFSZ REG.*

Online data source in xls format: http://www.bpdata.eu/mpt/2013ena09_04

BPDATA

Table 9.5: Regional inequalities: Gross monthly earnings[a]

Year	Central Hungary	Central Transdanubia	Western Transdanubia	Southern Transdanubia	Northern Hungary	Northern Great Plain	Southern Great Plain	Total
1997	70,967	56,753	52,934	51,279	51,797	50,021	50,245	58,022
1998	86,440	68,297	64,602	60,736	60,361	58,208	58,506	69,415
1999	101,427	77,656	74,808	70,195	70,961	68,738	68,339	81,067
2000	114,637	87,078	83,668	74,412	77,714	73,858	73,591	90,338
2001	132,136	100,358	96,216	86,489	88,735	84,930	84,710	103,610
2002	149,119	110,602	106,809	98,662	102,263	98,033	97,432	117,672
2003	170,280	127,819	121,464	117,149	117,847	115,278	113,532	135,472
2004	184,039	137,168	131,943	122,868	128,435	124,075	121,661	147,111
2005	192,962	147,646	145,771	136,276	139,761	131,098	130,406	157,770
2006	212,001	157,824	156,499	144,189	152,521	142,142	143,231	171,794
2007	229,897	173,937	164,378	156,678	159,921	153,241	153,050	186,229
2008	245,931	185,979	174,273	160,624	169,313	160,332	164,430	198,087
2009	254,471	187,352	182,855	169,615	169,333	160,688	164,638	203,859
2010	258,653	194,794	183,454	171,769	173,696	162,455	169,441	207,456
2011	264,495	197,774	184,311	181,500	185,036	173,243	177,021	214,540

[a] Gross monthly earnings (HUF/person), May.

Note: The data refer to full-time employees in the budgetary sector and firms employing at least 10 workers (1997–99), and at least 5 workers (2000–), respectively.

Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent09_05

BPDATA

Table 9.6: Regression-adjusted earnings differentials

Year	Central Hungary	Western Transdanubia	Southern Transdanubia	Northern Hungary	Northern Great Plain	Southern Great Plain
1997	0.0730	-0.0473	-0.1050	-0.1010	-0.1160	-0.1170
1998	0.0759	-0.0501	-0.1120	-0.1250	-0.1500	-0.1350
1999	0.1000	-0.0175	-0.1120	-0.1070	-0.1340	-0.1220
2000	0.0729	-0.0067	-0.1610	-0.1320	-0.1500	-0.1660
2001	0.0739	-0.0200	-0.1500	-0.1400	-0.1550	-0.1630
2002	0.0903	-0.0378	-0.1120	-0.0950	-0.1170	-0.1070
2003	0.0493	-0.0542	-0.1220	-0.1220	-0.1400	-0.1410
2004	0.0648	-0.0313	-0.1410	-0.0953	-0.1400	-0.1270
2005	0.0291	-0.0372	-0.1310	-0.1010	-0.1450	-0.1390
2006	0.0691	-0.0191	-0.1430	-0.0856	-0.1300	-0.1130
2007	0.0659	-0.0826	-0.1380	-0.1260	-0.1570	-0.1440
2008	0.0467	-0.0926	-0.1820	-0.1380	-0.1930	-0.1640
2009	0.0829	-0.0457	-0.1280	-0.1190	-0.1410	-0.1450
2010	0.0589	-0.0769	-0.1450	-0.1240	-0.1700	-0.1580
2011	0.1040	-0.0290	-0.0712	-0.0031	-0.0875	-0.0939

Note: the results indicate the earnings differentials of the various groups relative to the reference group in log points (approximately percentage points). All parameters are significant at the 0.01 level.

Reference category: female, with leaving certificate (general education certificate), not in the public sector, working in the Central-Transdanubia region.

Source: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent09_06

BPDATA

Table 9.7: Regional inequalities: Gross domestic product

Year	Central Hungary	Central Transdanubia	Western Transdanubia	Southern Transdanubia	Northern Hungary	Northern Great Plain	Southern Great Plain	Total
Thousand HUF/person/month								
1998	1,474	969	1,083	754	662	660	742	983
1999	1,710	1,051	1,275	859	731	707	819	1,113
2000	2,014	1,255	1,468	957	827	815	918	1,290
2001	2,311	1,372	1,539	1,074	947	965	1,031	1,458
2002	2,701	1,462	1,703	1,204	1,050	1,062	1,136	1,648
2003	2,940	1,719	2,001	1,321	1,186	1,213	1,254	1,841
2004	3,237	1,953	2,143	1,468	1,366	1,351	1,439	2,021
2005	3,564	2,056	2,169	1,517	1,439	1,390	1,483	2,185
2006	3,921	2,127	2,359	1,591	1,505	1,487	1,563	2,359
2007	4,105	2,300	2,430	1,691	1,587	1,563	1,643	2,485
2008	4,335	2,401	2,575	1,813	1,652	1,664	1,782	2,644
2009	4,291	2,126	2,384	1,762	1,562	1,659	1,692	2,556
2010	4,479	2,319	2,519	1,810	1,620	1,690	1,723	2,675
Per cent								
1998	147.8	98.1	110.5	77.2	68.0	67.7	76.3	100.0
1999	151.1	93.7	114.9	77.7	66.3	64.1	74.5	100.0
2000	152.2	97.3	113.9	74.8	64.6	63.4	71.8	100.0
2001	158.5	94.1	105.6	73.7	64.9	66.2	70.7	100.0
2002	163.9	88.7	103.4	73.0	63.7	64.4	68.9	100.0
2003	161.1	92.4	107.6	71.6	64.0	65.3	68.0	100.0
2004	157.9	95.3	104.5	71.6	66.6	65.9	70.2	100.0
2005	163.2	94.0	99.2	69.4	65.9	63.6	67.8	100.0
2006	166.2	90.2	100.0	67.4	63.8	63.0	66.3	100.0
2007	165.2	92.6	97.8	68.0	63.9	62.9	66.1	100.0
2008	164.0	90.8	97.4	68.6	62.5	62.9	67.4	100.0
2009	167.9	83.2	93.3	68.9	61.1	64.9	66.2	100.0
2010	167.4	86.7	94.2	67.7	60.6	63.2	64.4	100.0

Source: *KSH*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent09_07

BPDATA

Table 9.8: Commuting[a]

Year	Working in the residence		Commuter	
	in thousands	per cent	in thousands	per cent
1980	3,848.5	76.0	1,217.2	24.0
1990	3,380.2	74.7	1,144.7	25.3
2001	2,588.2	70.1	1,102.1	29.9
2005	2,625.1	68.2	1,221.3	31.8
2008	2,645.2	70.9	1,085.1	29.1

[a] For methodological notes see Dr. Lakatos Miklós – Váradi Rita: A foglalkoztatottak napi ingázásának jelentősége a migrációs folyamatokban (The role of daily commuting in geographical mobility). Statisztikai Szemle. (87), 2009. 7–8., 763–794.

Source: 1980-2005 NSZ, microcensus, 2008 *MEF* ad-hoc modul.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent09_08

BPDATA

Table 10.1: Strikes

Year	Number of strikes	Number of involved persons	Hours lost, in thousands
1995[a]	7	172,048	1,708.0
1996	8	4,491	19.0
1997	5	853	15.0
1998	7	1,447	3.0
1999	5	16,685	242.0
2000	5	26,978	1,192.0
2001	6	21,128	61.0
2002	4	4,573	9.0
2003	7	10,831	19.0
2004	8	6,276	116.0
2005	11	1,425	7.0
2006	16	24,665	52.0
2007	13	64,612	186.0
2008	8	8,633	..
2009	9	3,134	8.6
2010	7	3,263	133.1
2011	1	...	...

[a] Teachers strikes number partly estimated.
Source: *KSH* strike statistics.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent10_01

BPDATA

Table 10.2: National agreements on wage increase recommendations[a]

	OÉT Recommendations			Actual indexes	
Year	Minimum	Average	Maximum	Budgetary sector	Competitve sector
1997	114.0	..	122.0	123.2	121.8
1998	113.5	..	116.0	118.0	118.5
1999	112.0	..	115.0	119.2	114.8
2000	108.5	..	111.0	112.3	114.2
2001	..	..	..	122.9	116.3
2002	108.0	..	110.5	129.2	113.3
2003	..	4.5 % real wage growth	..	117.5	108.9
2004	..	107.0–108.0	..	100.4	109.3
2005	..	106.0	..	112.8	106.9
2006	..	104.0–105.0	..	106.4	109.3
2007	..	105.5–108.0	..	106.4	109.1
2008	..	105.0–107.5	..	106.2	108.4
2009	..	103.0–105.0	..	92.1	104.3
2010	..	real wage preservation	..	100.5[b]	102.6[b]
2011	..	104.0–106.0	..	103.8	105.3

[a] Average increase rates of gross earnings from recommendations by the National Interest Reconciliation Council (OÉT). Previous year = 100.
[b] Mean real wage index.
Source: *KSH, NGM.*

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent10_02

Table 10.3: Single employer collective agreements in the business sector

BPDATA

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of agreements	1,358	1,333	1,277	1,272	1,295	1,025	1,033	1,032	1,027	962	966	959
Number of persons covered	730,107	698,262	667,634	649,861	637,508	513,118	489,568	532,065	467,964	432,086	448,138	448,980

Source: *NMH,* Employment Relations Information System.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent10_03

Table 10.4: Single institution collective agreements in the public sector

BPDATA

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of agreements	2,079	2,077	2,019	2,026	2,020	1,750	1,435	1,711	1,710	1,737	1,751	1,744
Number of persons covered	272,051	268,139	251,849	251,352	250,492	228,080	203,497	224,246	222,547	225,434	224,651	222,136

Source: *NMH,* Employment Relations Information System.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent10_04

Table 10.5: Multi-employer collective agreements in the business sector

BPDATA

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of agreements	70	68	66	71	79	71	75	74	78	80	82	81
Number of persons covered	246,734	213,443	206,729	261,848	263,752	92,196	86,079	83,117	80,506	222,236	221,627	202,005

Source: *NMH,* Employment Relations Information System.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent10_05

Table 10.6: Multi-institution collective agreements in the public sector

BPDATA

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of agreements	12	10	9	9	10	5	4	2	1	1	1	1
Number of persons covered	2,357	2,081	2,045	2,042	2,072	403	360	238	..	..	..	320

Source: *NMH,* Employment Relations Information System.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent10_06

Table 10.7: The number of firm wage agreements, the number of affected firms, and the number of employees covered

BPDATA

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of agreements	572	471	531	545	515	298	302	214	202	785	905	888
Number of persons covered	334,056	259,033	279,753	316,585	347,223	169,639	151,022	171,259	100,206	377,677	414,522	416,562

Source: *NMH,* Employment Relations Information System.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent10_07

BPDATA

Table 10.8: The number of multi-employer wage agreements, the number of affected firms, and the number of covered companies and employees

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of agreements	23	19	18	22	19	40	44	40	45	62	68	68
Number of companies	211	181	172	243	145	145	162	147	150	2,350	2,460	2,199
Number of persons covered	125,327	68,882	76,129	88,855	25,175	35,039	42,817	33,735	40,046	191,258	211,753	180,131

Source: *NMH,* Employment Relations Information System.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent10_08

Table 11.1: Family benefits

BPDATA

Year	Tax credit for families[a]		Child benefit[b]		Regular child protection allowance[c]		Wage related maternity benefit[d]		Flat rate maternity benefits[d]	
	Average monthly amount, HUF	Average number of recipient families	Average monthly amount per family, HUF	Average number of recipient families	Average monthly amount, HUF	Average number of recipient families	Average monthly amount, HUF	Average number of recipients	Average monthly amount, HUF	Average number of recipients
2001	6,547	1,172,862	8,617	1,295,800	4,193	780,000	39,274	62,904	17,828	234,221
2002	6,588	1,069,911	10,034	1,277,900	4,338	758,000	44,901	70,167	19,842	222,104
2003	6,841	1,009,660	11,283	1,292,000	4,705	704,000	48,742	77,942	22,091	214,640
2004	6,941	969,512	11,971	1,290,200	5,236	670,000	54,322	83,678	24,174	210,509
2005	6,979	924,263	12,597	1,264,500	5,619	663,000	58,484	87,172	25,706	208,708
2006	9,392	122,883	21,637	1,269,000	–	–	62,684	91,678	27,102	212,741
2007	..	..	23,031	1,224,000	–	–	68,394	93,973	28,496	207,608
2008	..	..	24,521	1,246,600	–	–	73,902	94,515	30,880	208,652
2009	..	..	24,524	1,245,900	–	–	78,725	95,050	30,328	214,416
2010	..	..	24,442	1,224,000	–	–	81,356	94,682	30,041	217,807
2011	..	..	24,528	1,190,707	–	–	84,929	87,615	..	207,550

[a] Introduced in 1999. Beginning in 2006, this became a part of family benefits, only families with 3 or more children are entitled to tax credits in the amount of 4,000 HUF per child.
[b] Annual mean. From 1999 to 2002. November 8, the child care benefit includes the family allowance and schooling support. Beginning in 2002, the benefits paid in the 13th month are included as well.
[c] Annual average. Was in use from 1998 to 2005.
[d] Annual average.
Source: *NAV, KSH* Welfare Statistics.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent11_01

Table 11.2: Unemployment benefits and average earnings

BPDATA

Year	Insured unemployment benefit and other non-means tested benefits[a]		Means tested unemployment assistance[b]		Net monthly earnings, HUF[c]		
	Average monthly amount, HUF	Average number of recipients	Average monthly amount, HUF	Average number of recipients	Male	Female	Together
2001	25,677	119,210	14,749	142,001	69,910	59,059	64,750
2002	30,113	114,934	14,869	132,895	82,745	72,036	77,770
2003	34,762	107,226	15,010	138,127	94,612	84,632	89,906
2004	37,107	109,654	15,864	144,853	98,101	87,710	93,233
2005	39,593	111,732	16,991	158,565	108,139	98,625	103,727
2006	43,344	109,095	23,771	160,426	..	..	110,951
2007	46,208	96,463	25,703	194,716	..	..	114,282
2008	49,454	97,047	27,347	213,436	..	..	122,267
2009	51,831	152,197	26,817	71,816	..	..	124,116
2010	50,073	125,651	..	..	..	..	132,628
2011	52,107	110,803	..	..	..	..	141,127

[a] Average of headcount at the end of the month. Includes the pre-pension allowance (2001–2002).
[b] This scheme changed substantially in July 2006, therefore figures for 2006 are given for the period July-December 2006.
[c] The average net wage refers to the entire economy, competitive sector after 2001: firms with at least 4 employees.
Source: NFSZ: *Labour Market Report, 2001*. KSH: *Welfare systems 2007, Welfare Statistics, Yearbook of Demographics. KSH Social Statistics Yearbooks.*

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent11_02

BPDATA

Table 11.3: Number of those receiving self-entitled pension, and the mean sum of the provisions they received in January of the given year

Year	Old age pension			Disability pension under and above retirement age		
	Number of recipients	Average amount before increase, HUF	Average amount after increase, HUF	Number of recipients	Average amount before increase, HUF	Average amount after increase, HUF
2000	1,671,090	33,258	35,931	762,514	29,217	31,556
2001	1,667,945	37,172	41,002	772,286	32,381	35,705
2002	1,664,062	43,368	47,561	789,544	37,369	40,972
2003	1,657,271	50,652	54,905	799,966	43,185	46,801
2004	1,637,847	57,326	60,962	806,491	48,180	51,220
2005	1,643,409	63,185	67,182	808,107	52,259	55,563
2006	1,658,387	69,145	72,160	806,147	56,485	58,935
2007	1,676,477	74,326	78,577	802,506	59,978	63,120
2008	1,716,315	81,975	87,481	794,797	65,036	69,160
2009	1,731,213	90,476	93,256	779,130	70,979	73,166
2010	1,719,001	94,080	98,804	750,260	73,687	77,500
2011	1,700,800	99,644	104,014	721,973	77,945	81,367

Source: *ONYF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent11_03

BPDATA

Table 11.4: Number of those receiving social annuities for people with damaged health, and the mean sum of the provisions they received after the increase, in January of the given year

Year	Temporary annuity		Regular social annuity		Health damage annuity for miners		Total	
	Number of recipients	Average amount, HUF	Number of recipients	Average amount, HUF	Number of recipients	Average amount, HUF	Number of recipients	Average amount, HUF
2000	15,491	18,309	196,689	14,435	2,852	48,581	215,032	15,167
2001	15,640	20,809	198,820	15,610	3,304	53,379	217,764	16,556
2002	11,523	26,043	200,980	17,645	3,348	59,558	215,851	18,744
2003	12,230	30,135	203,656	19,907	3,345	65,380	219,231	21,171
2004	11,949	33,798	207,300	21,370	2,950	69,777	222,199	22,681
2005	13,186	36,847	207,091	22,773	2,839	74,161	223,116	24,259
2006	14,945	40,578	195,954	23,911	2,786	77,497	213,685	25,776
2007	19,158	42,642	184,845	25,050	2,693	80,720	206,696	27,406
2008	21,538	46,537	170,838	27,176	2,601	85,805	194,977	30,096
2009	21,854	46,678	159,146	27,708	2,533	86,165	183,533	30,774
2010	20,327	47,060	148,704	27,645	2,448	86,252	171,479	30,783
2011	16,448	47,096	139,277	27,588	2,371	86,411	158,096	30,500

Source: *ONYF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent11_04

Table 11.5: The number of those receiving a disability annuity and the mean sum of the provisions they received after the increase, in January of the given year

BPDATA

Year	Disability annuity		Year	Disability annuity	
	Number of recipients	Average amount, HUF		Number of recipients	Average amount, HUF
2004	27,923	25,388	2008	30,677	32,709
2005	28,738	27,257	2009	31,263	33,434
2006	29,443	28,720	2010	31,815	33,429
2007	30,039	30,219	2011	32,314	33,429

Source: *ONYF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent11_05

Table 11.6: The median age for retirement and the number of pensioners

BPDATA

Pension	2002		2003		2004		2005		2006	
	Age	Persons	Age	Persons	Age	Persons	Age	Persons	Age	Persons
Females										
Old age and similar	56.8	25,730	58.8	13,591	57.6	36,806	57.7	45,115	57.5	46,093
Disability and accident-related disability	48.1	23,649	48.5	21,507	48.7	19,901	49.1	19,250	49.3	18,488
Total	52.6	49,379	52.5	35,098	54.5	56,707	55.1	64,365	55.2	64,581
Males										
Old age and similar	60.1	30,217	59.7	32,611	60.1	36,111	59.9	30,560	59.9	33,134
Disability and accident-related disability	49.7	29,013	50.0	27,115	50.1	24,915	50.5	24,565	50.6	23,045
Total	55.0	59,230	55.3	59,726	56.0	61,026	55.7	55,125	56.1	56,179
Together										
Old age and similar	58.6	55,947	59.5	46,202	58.9	72,917	58.6	75,675	58.5	79,227
Disability and accident-related disability	49.0	52,662	49.3	48,622	49.5	44,816	49.9	43,815	50.0	41,533
Total	53.9	108,609	54.3	94,824	55.3	117,733	55.4	119,490	55.6	120,760
	2007		2008		2009		2010		2011[a]	
Females										
Old age and similar	57.8	62,015	57.3	39,290	59.9	15,243	60.7	13,617	58.5	84,550
Disability and accident-related disability	49.8	15,837	50.5	8,565	51.1	9,065	50.8	10,478	50.6	8,512
Rehabilitation annuity	–	–	44.1	1,604	44.9	6,574	47.6	6,789	47.1	4,374
Total	56.2	77,852	55.7	49,459	54.1	30,882	54.4	30,884	57.3	97,436
Males										
Old age and similar	59.7	50,878	59.8	25,749	59.7	37,116	60.2	37,219	60.4	42,708
Disability and accident-related disability	51.1	19,032	51.9	11,069	52.3	11,992	52.1	13,345	51.9	10,452
Rehabilitation annuity	–	–	44.5	1,556	44.8	6,278	47.4	6,123	47.0	4,085
Total	57.4	69,910	56.9	38,374	56.4	55,386	56.9	56,687	57.9	57,245
Together										
Old age and similar	58.7	112,893	58.3	65,039	59.7	52,359	60.3	50,836	59.0	127,258
Disability and accident-related disability	50.5	34,869	51.3	19,634	51.8	21,057	51.5	23,823	51.3	18,964
Rehabilitation annuity	–	–	44.3	3,160	44.9	12,852	47.5	12,912	47.1	8,459
Total	56.8	147,762	56.2	87,833	55.6	86,268	56.0	87,571	57.5	154,681

[a] 2011 data are preliminary.

Note: The source of these statistics is data from the pension determination system of the ONYF (NYUGDMEG), so these do not include the data for the armed forces and the police. Data on MÁV is included from 2008.

Source: *ONYF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent11_06

BPDATA

Table 11.7: Newly determined disability pension claims and detailed data on the number of newly determined old-age pension claims

	Disability and accident-related disability pension	Old-age and old-age type pensions[a]			From the total: at the age limit			From the total: under the age limit		
Year	Total	Male	Female	Together	Male	Female	Together	Male	Female	Together
1996	59,967	31,770	59,939	91,709	9,893	20,073	29,966	18,681	31,857	50,538
1997	48,262	37,886	32,614	70,500	10,630	1,138	11,768	24,308	28,154	52,462
1998	42,975	12,908	17,841	30,749	385	882	1,267	11,461	15,244	26,705
1999	46,701	15,181	24,418	39,599	2,601	5,808	8,409	11,494	16,922	28,416
2000	55,558	18,071	29,526	47,597	613	813	1,426	16,089	26,859	42,948
2001	54,645	28,759	14,267	43,026	2,200	4,882	7,082	25,175	7,396	32,571
2002	52,211	30,209	25,719	55,928	2,593	646	3,239	26,346	23,503	49,849
2003	48,078	32,574	13,574	46,148	3,058	5,098	8,156	28,064	6,537	34,601
2004	44,196	35,940	36,684	72,624	3,842	989	4,831	30,234	33,817	64,051
2005	41,057	33,175	48,771	81,946	4,035	6,721	10,756	27,719	40,142	67,861
2006	36,904	34,207	47,531	81,738	4,013	732	4,745	29,025	45,675	74,700
2007	34,991	51,037	62,168	113,205	3,722	6,660	10,382	45,731	54,177	99,908
2008	19,832	25,912	39,423	65,335	3,154	288	3,442	22,180	38,761	60,941
2009	21,681	37,468	15,468	52,936	4,193	6,692	10,885	32,452	8,289	40,741
2010	24,094	37,394	13,719	51,113	6,350	7,213	13,563	29,990	5,801	35,791
2011[b]	18,964	42,708	84,550	127,258	8,934	7,855	16,789	32,205	75,849	108,054

[a] Old-age type pensions include: old-age pensions given with a retirement age threshhold allowance (early retirement), artists' pensions, pre-pension up until 1997, miners' pensions.
[b] 2011 data are preliminary.
Note: Pensions disbursed in the given year (determined according to the given year's rules). The source of these statistics is data from the pension determination system of the ONYF (NYUGDMEG), so these do not include the data for the armed forces and the police.
Source: *ONYF*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent11_07

Table 11.8: Retirement age threshhold

BPDATA

	Calendar year															
Birth year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1948	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
1949	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
1950	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
1951	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
1952 I.	57	58	59	60	61	62.5	63	64	65	66	67	68	69	70	71	72
1952 II.	57	58	59	60	60	62	62.5	64	65	66	67	68	69	70	71	72
1953	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
1954 I.	55	56	57	58	59	60	61	62	63.5	64	65	66	67	68	69	70
1954 II.	55	56	57	58	59	60	61	62	63	63.5	65	66	67	68	69	70
1955	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
1956 I.	53	54	55	56	57	58	59	60	61	62	63	64.5	65	66	67	68
1956 II.	53	54	55	56	57	58	59	60	61	62	63	64	64.5	66	67	68
1957	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
1958	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
1959	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
1960	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

Those are entitled to receive old age pension who have are at least of the age of the old age pension threshold indicated in the legislature – marked grey in the table – relevant to them (uniform for men and women), who have fulfilled the required number of years of service, and who are not insured. In the case of full old age pension, the minimum service time is 20 years, for partial pension it is 15 years. The table displays the old age pension age threshold in the case of a „representative person". The cells show the age, based on the calendar year, of a person born in the given year.

Women who have accumulated at least 40 years towards entitlement (which is not necessarily the same as 40 years of service) are entitled to old age pension, regardless of their age.

According to the 2011 legislature number CLXVII, following December 31st, 2011, no pension can be determined prior to the age threshold. At the same time, the legislature ensures allowances that had been determined earlier to be continued under different legal titles (pre-retirement age pension is replaced by pre-retirement age provision, service pension by service salary), as well as closure of acquisitions, and the opportunity for the enforcement of acquired rights.

Pre-retirement age pension: early and reduced amount early old age pension, pensions with age preference, miner's pension, artist's pension, pre-retirement age old age pension of parliamentary and European parliamentary representatives and mayors, pre-pension, service pension of professional members of the armed forces.

Source: 1997. legislature number LXXXI.; 2011. legislature number CLXVII., http://www.jozsefvaros.hu/dokumentumok/234_korhatar_elotti_nyudij_ellatasok.pdf.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent11_08

BPDATA

Table 12.1: The mean, minimum, and maximum value of the personal income tax key, per cent

Year	Mean tax burden, per cent	The personal income tax key projected on the gross wage	
		minimum	maximum
1988	..	0	60
1989	..	0	56
1990	..	0	50
1991	..	0	50
1992	..	0	40
1993	..	0	40
1994	..	0	44
1995	..	0	44
1996	..	20	48
1997	..	20	42
1998	..	20	42
1999	..	20	40
2000	..	20	40
2001	..	20	40
2002	..	20	40
2003	..	20	40
2004	..	18	38
2005	18.89	18	38
2006	19.03	18	36
2007	18.63	18	36
2008	18.86	18	36
2009	18.10	18	36
2010[a]	16.34	21.59	40.64
2011[a]	13.78	20.32	20.32
2012[b]	..	16.00	20.32

[a] In 2010 the nominal tax key was 17% up to 5 000 000 HUF, above 5 000 001 HUF it was 32% of the part above 850 000 HUF and 5 000 000 HUF. In 2011, the nominal tax key was 16%. The joint tax base is the amount of income appended with the tax base supplement (equal to 27%).

[b] In 2012 the nominal tax key was 16%. The joint tax base is the amount of income appended with the tax base supplement.

The amount of the tax base supplement:
– does not need to be determined for the part of the income included in the joint tax base that does not surpass 2 million 424 thousand HUF,
– should be determined as 27 % of the part of the income included in the joint tax base that is over 2 million 424 thousand HUF.

Source: Mean tax burden: http://nav.gov.hu/nav/szolgaltatasok/adostatisztikak/szemelyi_jovedelemado/szja_2011.html. Other data: http://nav.gov.hu/nav/szolgaltatasok/adokulcsok_jarulekmertekek/adotablak.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent12_01

Table 12.2: Changes in the magnitude of the tax wedge in the case of minimum wage and the temporary work booklet (AMK)

BPDATA

Year	Minimum wage				Total wage cost in the case of minimum wage		Minimum wage tax wedge, %	AMK public burden[a], HUF/day		Total wage cost[a], HUF/day		AMK tax wedge, %[a]	
	gross, HUF/month	gross, HUF/day	net, HUF/month	net, HUF/day	HUF/month	HUF/day		general	registered unemployed	general	registered unemployed	general	registered unemployed
1997	17,000	783	15,045	693	26,450	1,196	43.1	500	500	1,193	1,193	41.9	41.9
1998	19,500	899	17,258	795	30,297	1,369	43.0	500	500	1,295	1,295	38.6	38.6
1999	22,500	1,037	18,188	838	34,538	1,546	47.3	500	500	1,338	1,338	37.4	37.4
2000	25,500	1,175	20,213	931	38,963	1,746	48.1	800	800	1,731	1,731	46.2	46.2
2001	40,000	1,843	30,000	1,382	58,400	2,638	48.6	1,600	1,600	2,982	2,982	53.6	53.6
2002	50,000	2,304	36,750	1,694	71,250	3,226	48.4	1,000	500	2,694	2,194	37.1	22.8
2003	50,000	2,304	42,750	1,970	70,200	3,191	39.1	1,000	500	2,970	2,470	33.7	20.2
2004	53,000	2,442	45,845	2,113	74,205	3,376	38.2	1,000	500	3,113	2,613	32.1	19.1
2005	57,000	2,627	49,305	2,272	79,295	3,572	37.8	700	500	2,972	2,772	23.6	18.0
2006	62,500	2,880	54,063	2,491	85,388	3,910	36.7	700	700	3,191	3,191	21.9	21.9
2007	65,500	3,018	53,915	2,485	89,393	4,095	39.7	700	700	3,185	3,185	22.0	22.0
2008	69,000	3,180	56,190	2,589	94,065	4,310	40.3	900	900	3,489	3,489	25.8	25.8
2009	71,500	3,295	57,815	2,664	97,403[b]	4,464	40.6	900	900	3,564	3,564	25.3	25.3
2010	73,500	3,387	60,236	2,776	94,448	4,352	36.2	900	900	3,676	3,676	24.5	24.5

	Minimum wage				Total wage cost in the case of minimum wage		Minimum wage tax wedge, %	Simplified employment[c], Ft/day		Total wage cost, HUF/day		Tax wedge, simplified employment, %	
	gross, HUF/month	gross, HUF/day	net, HUF/month	net, HUF/day	HUF/month	HUF/day		temporary work	seasonal agricultural/tourism work	temporary work	seasonal agricultural/tourism work	temporary work	seasonal agricultural/tourism work
2011	78,000	3,594	60,600	2,793	100,230	4,619	39.5	1,000	500	3,793	3,293	26.4	15.2
2012	93,000	4,280	60,915	2,803	119,505	5,500	49.0	1,000	500	3,803	3,303	26.3	15.1

[a] Wage paid in the amount in accordance with the gross daily minimum wage column and in case of work performed with a temporary work booklet. The basis for the comparison with the minimum wage is the assumption that employers pay temporary workers the smallest possible amount.

[b] According to regulations pertaining to the first half of 2009.

[c] From April 1st, 2010 the temporary work booklets and the public contribution tickets were discontinued, these were replaced by simplified employment.

Note: The tax wedge is the quotient of the total public burden (tax and contribution) and the total wage cost, it is calculated as: tax wedge = (total wage cost – net wage)/total wage cost.

Source: Minimum wage: http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_qli041.html. Public contribution ticket: 1997. legislation number LXXIV. Simplified employment: 2010. legislation number LXXV. Based on calculations of Ágota Scharle.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent12_02

BPDATA

Table 12.3: The monthly amount of the minimum wage, the guaranteed wage minimum, and the minimum pension, in thousands of current-year HUF

Date	Monthly amount of the minimum wage, HUF	As a percentage of mean gross earnings	As a ratio of APW, %	Guaranteed wage minimum, HUF	Minimum pension, HUF
1990. II. 1.	4,800	..	40.9	–	4,300
1991. IV.1.	7,000	..	..	–	5,200
1992. I. 1.	8,000	35.8	41.4	–	5,800
1993. II. 1.	9,000	33.1	39.7	–	6,400
1994. II. 1.	10,500	30.9	37.8	–	7,367
1995. III. 1.	12,200	31.4	37.0	–	8,400
1996. II. 1.	14,500	31.0	30.1	–	9,600
1997. I. 1.	17,000	29.7	35.1	–	11,500
1998. I. 1.	19,500	28.8	34.4	–	13,700
1999. I. 1.	22,500	29.1	34.6	–	15,350
2000. I. 1.	25,500	29.1	35.0	–	16,600
2001. I. 1.	40,000	38.6	48.3	–	18,310
2002. I. 1.	50,000	40.8	54.5	–	20,100
2003. I. 1.	50,000	36.4	51.5	–	21,800
2004. I. 1.	53,000	37.2	50.7	–	23,200
2005. I. 1.	57,000	33.6	49.2	–	24,700
2006. I. 1.	62,500	36.5	52.3	68,000	25,800
2007. I. 1.	65,500	35.4	49.2	75,400	27,130
2008. I. 1.	69,000	34.7	49.5	86,300	28,500
2009. I. 1.	71,500	35.8	50.0	87,500	28,500
2010. I. I.	73,500	36.3	49.5	89,500	28,500
2011. I. I.	78,000	36.6	49.8	94,000	28,500
2012. I. I.	93,000	..	..	108,000	28,500

Notes: Up to 1999, sectors employing unskilled labour usually received an extension of a few months for introducing the new minimum wage. The guaranteed wage minimum applies to skilled employees. The minimum wage is exempt from the personal income tax from September 2002. This policy resulted in a 15,9% increase in the net minimum wage. APW: mean wage of workers in the processing industry, based on the NMH BT. In 1990, the data is the previous year's data, indexed (since there was no NMH BT conducted in 1990).

Source: Minimum wage: 1990–91: http://www.mszosz.hu/files/1/64/345.pdf, 1992–: *KSH*. Guaranteed wage minimum: http://www.nav.gov.hu/nav/szolgaltatasok/adokulcsok_jarulekmertekek/minimalber_garantalt. Minimum pension: http://www.ksh.hu/docs/hun/xtabla/nyugdij/tablny11_03.html. APW: *NMH BT*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent12_03

BPDATA

Table 12.4: The tax burden on work as a ratio of tax revenue and earnings

Year	Tax burden on work as a ratio of tax revenue[a], %	Implicit tax key[b]	Tax wedge on 67% level of mean earnings	Tax wedge on the minimum wage[c]
1990		..	..	38.2
1991	52.4	..	..	40.4
1992	54.8	..	..	40.9
1993	54.4	..	..	42.3
1994	53.7	..	..	41.2
1995	52.1	42.3	..	44.2
1996	52.5	42.1	..	41.8
1997	54.2	42.5	..	43.1
1998	53.1	41.8	..	43.0
1999	51.5	41.9	..	47.3
2000	51.8	41.4	51.4	48.1
2001	53.1	40.9	50.9	48.6
2002	53.7	41.2	48.2	48.4
2003	51.8	39.3	44.5	39.1
2004	50.1	38.3	44.8	38.2
2005	51.1	38.4	43.1	37.8
2006	51.7	38.8	43.3	36.7
2007	52.0	41.0	46.0	39.7
2008	53.0	42.3	46.7	40.3
2009	51.4	40.8	46.3	40.6[d]
2010	49.7	39.4	43.6	36.2

[a] Tax burden on work and contributions as a ratio of tax revenue from all tax forms.
[b] The implicit tax key is the quotient of the revenue from taxes and contributions pertaining to work and the income derived from work.
[c] The tax wedge is the quotient of the total public burden (tax and contribution) and the total wage cost, it is calculated as: tax wedge = (total wage cost – net wage)/total wage cost.
[d] The tax wedge of the minimum wage is the 2009 annual mean (the contributions decreased in June).

Source: 1991–1995: estimate of Ágota Scharle based on Ministry of Finance (PM) balance sheet data. 1996–2009: http://ec.europa.eu/taxation_customs/taxation/gen_info/economic_analysis/tax_structures/index_en.htm. 2010: Eurostat online database. Implicit tax key: *Eurostat* online database (gov_a_tax_itr). Tax wedge on the 67 percent level of the mean wage: *OECD*: Taxing wages 2010, Paris 2011, tax wedge at the level of the minimum wage: calculations of Ágota Scharle.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent12_04

BPDATA

Table 13.1: Employment and unemployment rate of population aged 15–64 by gender in the EU, 2011

	Employment rate			Unemployment rate		
Country	males	females	together	males	females	together
Austria	77.8	66.5	72.1	4.0	4.3	4.2
Belgium	67.1	56.7	61.9	7.1	7.2	7.2
Denmark	75.9	70.4	73.1	7.7	7.5	7.6
United Kingdom	74.5	64.5	69.5	8.7	7.3	8.0
Finland	70.6	67.4	69.0	8.4	7.1	7.8
France	68.1	59.7	63.8	8.8	9.8	9.3
Greece	65.9	45.1	55.6	15.0	21.4	17.7
Netherlands	79.8	69.9	74.9	4.5	4.4	4.4
Ireland	63.1	55.4	59.2	17.5	10.6	14.4
Luxembourg	72.1	56.9	64.6	3.8	6.3	4.9
Germany	77.3	67.7	72.5	6.2	5.6	5.9
Italy	67.5	46.5	56.9	7.6	9.6	8.4
Portugal	68.1	60.4	64.2	12.7	13.2	12.9
Spain	63.2	52.0	57.7	21.2	22.2	21.7
Sweden	76.3	71.8	74.1	7.6	7.5	7.5
EU-15	71.2	59.7	65.5	9.5	9.7	9.6
Hungary	61.2	50.6	55.8	11.0	10.9	10.9
Bulgaria	60.9	56.2	58.5	12.3	10.0	11.2
Cyprus	74.7	61.6	68.1	7.9	7.7	7.8
Czech Republic	74.0	57.2	65.7	5.8	7.9	6.7
Estonia	67.7	62.8	65.1	13.1	11.8	12.5
Poland	66.3	53.1	59.7	9.0	10.5	9.7
Latvia	62.9	60.8	61.8	17.6	13.1	15.4
Litenania	60.9	60.5	60.7	17.8	13.0	15.4
Malta	73.6	41.0	57.6	6.1	7.1	6.5
Romania	65.0	52.0	58.5	7.9	6.8	7.4
Slovakia	66.3	52.7	59.5	13.5	13.6	13.5
Slovenia	67.7	60.9	64.4	8.2	8.2	8.2
EU-25	70.5	58.8	64.6	9.6	9.8	9.7
EU-27	70.1	58.5	64.3	9.5	9.7	9.6

Source: *CIRCA*.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent13_01

BPDATA

Table 13.2: Employment composition of the countries in the EU[a], 2011

Country	Self employed	Part time	Fix term contr.	Service	Industry	Agriculture
Austria	11.3	24.3	9.6	69.0	26.3	4.8
Belgium	12.8	24.7	8.9	75.5	23.3	1.2
Denmark	8.4	25.1	8.9	77.7	20.1	2.2
United Kingdom	13.1	25.5	6.0	79.6	19.3	1.1
Finland	12.2	14.1	15.5	72.9	23.1	4.0
France	10.9	17.6	15.2	74.8	22.3	2.9
Greece	30.4	6.6	11.6	70.2	18.0	11.8
Netherlands	13.7	48.5	18.2	80.1	17.2	2.7
Ireland	15.1	22.9	9.9	76.9	19.2	3.9
Luxembourg	7.7	18.0	7.1	85.6	13.2	1.2
Germany	10.5	25.7	14.8	70.0	28.5	1.5
Italy	22.5	15.2	13.4	67.8	28.6	3.5
Portugal	16.5	10.1	22.2	65.0	28.7	6.4
Spain	15.5	13.7	25.4	73.9	21.9	4.2
Sweden	9.4	14.7	15.9	78.1	20.1	1.8
EU-15	14.0	21.7	14.2	73.4	23.9	2.8
Hungary	11.4	6.4	8.9	64.3	30.9	4.8
Bulgaria	10.9	2.2	4.1	61.4	32.0	6.7
Cyprus	15.1	8.7	13.7	75.4	21.7	2.9
Czech Republic	17.2	4.7	8.0	58.4	38.7	3.0
Estonia	8.0	9.3	4.5	63.0	32.8	4.3
Poland	18.5	7.3	26.9	56.9	30.9	12.2
Latvia	10.2	8.8	6.5	67.1	23.6	9.4
Litenania	8.9	8.2	2.8	66.9	24.7	8.4
Malta	13.0	12.4	6.5	74.0	25.0	1.1
Romania	17.9	9.3	1.5	44.4	30.0	25.5
Slovakia	15.8	3.9	6.5	59.4	37.5	3.1
Slovenia	11.9	9.5	18.0	60.7	32.3	7.0
EU-25	14.3	19.4	14.6	71.2	25.2	3.7
EU-27	14.4	18.8	14.0	70.0	25.4	4.6

[a] All employed = 100.
Source: *Eurostat* (Newcronos) Labour Force Survey.

Online data source in xls format: http://www.bpdata.eu/mpt/2013ent13_02

DESCRIPTION OF THE MAIN DATA SOURCES

The data have two main sources in terms of who gathered them: the regular institutional and population surveys of the Hungarian Central Statistical Office (CSO, in Hungarian: Központi Statisztikai Hivatal, KSH), and the register and surveys of the National Labour Office (in Hungarian: Nemzeti Munkaügyi Hivatal, NMH).

MAIN DATA SOURCES OF KSH

Labour Force Survey – KSH MEF

The KSH has been conducting a new statistical survey since January 1992 to obtain ongoing information on the labour force status of the Hungarian population. The MEF is a household survey which provides quarterly information on the non-institutional population aged 15–74. The aim of the survey is to observe employment and unemployment according to international statistical recommendations based on the concepts and definitions recommended by the International Labour Organization (ILO), independently from existing national labour regulations or their changes.

In international practice, the labour force survey is a widely used statistical tool to provide simultaneous, comprehensive, and systematic monitoring of employment, unemployment, and underemployment. The survey techniques minimise the subjective bias in classification (since people surveyed are classified by strict criteria), and provide freedom to also consider national characteristics.

In the MEF, the surveyed population is divided into two main groups according to the economic activity performed by them during the reference week (up to 2003, this was always on the week containing the 19th of the month): economically active persons (labour force), and economically inactive persons.

The group of economically active persons consists of those in the labour market either as employed or unemployed persons during the reference week.

The definitions used in the survey follow ILO recommendations. According to these, those designated employed are persons who, during the reference week worked one hour or more earning some form of income, or had a job from which they were only temporarily absent (on leave, illness, etc.).

Work providing income includes all activities that:
– result in monetary income, payment in kind, or
– that were carried out in the hopes of income realized in the future, or
– were performed without payment in a family business or on a farm (i.e. unpaid family workers).

From the survey's point of view the activities below are not considered as work:
– work done without payment for another household or institution (voluntary work),
– building or renovating of an own house or flat, internships tied to education (not even if it is compensated),
– housework, including work in the garden. Work on own land is only considered to generate income if the results are sold in the market, not produced for self-consumption.

Persons on child-care leave are classified – based on the 1995 ILO recommendations for transitional countries determined in Prague – according to their activity during the survey week.

Since the according to the system of national accounting, defense activity contributes to the national product, conscripts are generally considered as economically active persons, any exceptions are marked in the footnotes of the table. The data regarding the number of conscripts comes from administrative sources.

Unemployed persons are persons aged 15–74 who:
– were without work, i.e. neither had a job nor were at work (for one hour or more) in paid employment or self-employment during the reference week,
– had actively looked for work at any time in the four weeks up to the end of the reference week,
– were available for work within two weeks following the reference week if they found an appropriate job.

Those who do not have a job, but are waiting to start a new job within 30 days (since 2003 within 90 days) make up a special group of the unemployed. They are not subject to all three criteria.

Active job search includes: contacting a public or private employment office to find a job, applying to an employer directly, inserting, reading, answering advertisements, asking friends, relatives or other methods.

The labour force (i.e. economically active population) comprises employed and unemployed persons.

Persons are defined economically inactive (i.e. not in the labour force) if they were neither employed in regular, income-earning jobs, nor searching for a job, or, if they searched, they could not have started work. Passive unemployed are included here, who desire a job, but have given up any active search for work, because they do not believe that they have a chance of finding any.

The MEF is based on a multi-stage stratified sample design. The stages of sampling are defined as follows: primary sampling units (PSUs) are enumeration districts (EDs) and secondary sampling units (SSUs) are dwellings in settlements with 15,000 or more inhabitants, while PSUs are settlements, SSUs are EDs and ultimate sampling units are dwellings in all other cases. In the MEF sample design strata are defined in terms of geographic units, size categories of settlements and area types such as city centres, outskirts, etc.

The size of the sample means that the main indicators of the labour market are representative in terms of regions (NUTS2) as well. The quarterly MEF sample includes a sample of three randomly selected dwellings, and labour market information is collected from one household each month. From 1998, the quarterly sample contains about 33,000 households and 66,000 persons. The sample has a simple rotation pattern: any household entering the sample at some time is expected to provide labour market information for six consecutive quarters, then leave the sample permanently. The intersection of the samples of two consecutive periods tend to be less than the 5/6th that would be obtained at a 100 per cent response rate.

Since 2003, the weights used to make the sample representative are based on the 2001 census population record base. At the same time, the 2001–2002 data was recalculated and replaced as well. The sampling weights for 1992–2000 data are based on the 1990 census.

Institution-Based Labour Statistics – KSH IMS

The source of the earnings data is the monthly (annual) institutional labour statistical survey. The sample frame covers enterprises with at least 5 employees, and public and social insurance and non-profit institutions irrespective of the staff numbers of employees.

The earnings data relate to the full-time employees on every occasion. The potential elements of the prevailing monthly average earnings are: base wage, allowances (including the miner's loyalty bonus, and the Széchenyi and Professor's scholarships), supplementary payments, bonuses, premiums, and wages and salaries for the 13th and further months.

Net average earnings are calculated by deducting from the institution's gross average earnings the employer's contributions, the personal income tax, the employee's social security contributions, etc., according to the actual rates (i.e. taking into account the threshold concerning the social security contributions and employee deductions). The personal income tax is calculated based on the actual withholding rate applied by the employers when disbursing monthly earnings in the given year, the net values are calculated at the institutional and monthly level.

The size and direction of the difference between the gross and the net (after-tax) income indexes depends on actual annual changes in the tax table (tax brackets) and in the tax allowances. Thus the actual size of the differences are also influenced by the share of individuals at given firms that fall outside the bracket for employee allowances.

The indexes pertain to the comparable sample, taking changes in the definitions, and of the sample frame into account. The KSH traditionally publishes the main average index as the earnings growth measure. Thus the indicator of change in earnings reflects both the changes in the number of observations and the actual earnings changes simultaneously. The change of net real earnings is calculated from the ratio of net income index and the consumer price index in the same period.

Non-manual workers are persons with occupations classified by the standardized occupational code (FEOR, version since January 1, 1994) in major groups 1–4., manual workers are persons with occupations classified in major groups 5–9.

Labour Force Accounting Census – KSH MEM

Before the publication of the MEF, the annual MEM gave account of the total labour force in the time period between the two censuses.

The MEM, as its name shows, is a balance-like account that compares the labour supply (human resources) to the labour demand at an ideal moment (1 January). Population is taken into account by economic activity, with a differentiation between statistical data those of working age, and the population outside of the working age. Source of data: Annual labour survey on employment since 1992 of enterprises and of all government institutions, labour force survey, census, national healthcare records, social security records, and company registry. Data on unemployment comes from the registration system of the NMH.

Other data sources

Census data were used for the estimation of the employment data in 1980 and 1990. The aggregate economic data are based on national account statistics, the consumer's and producer's price statistics and industrial surveys. A detailed description of the data sources are to be found in the relevant publications of the KSH.

MAIN DATA SOURCES OF NMH

Unemployment (Jobseekers') Register Database – NFSZ-REG

The other main source of unemployment data in Hungary – and in most of the developed countries – is the huge database containing so called administrative records which are collected monthly and include the individual data of the registered unemployed/jobseekers.

The register actually includes all jobseekers, but out of them, at a given point of time, only those are regarded as registered unemployed/jobseekers, who:

– had themselves registered with a local office of the NFSZ as unemployed/jobseekers (i. e. he/she has no job but wishes to work, for which they seek assistance from the labour market organisation).
– at the time of the examination (on the final day of any month), the person is not a pensioner or a full-time student, and is ready to co-operate with the local employment office in order to become employed (i. e. he/she accepts the suitable job or training offered to him/her, and keeps the appointments made with the local employment office's placement officer/counsellor/benefit administrator).

If a person included in the register is working under any subsidised employment programme on the closing day, or is a participant of a labour market training programme, her/his unemployed/jobseeker status is suspended.

If the client is not willing to co-operate with the local office, he/she is removed from the register of the unemployed/jobseekers.

The data – i. e. the administrative records of the register – allow not only for the identification of date-related stock data, but also for monitoring flows, inflows as well as outflows, within a period.

The database contains the number of decrees pertaining to the removal or suspension of jobseeking benefits, the number of those receiving monetary support based on accounting items, support transactions, the exact date of entry and exit and the reason for the exit (for example, job placement, the end of entitlement, disqualification, entry into subsidized employment programme, etc.), as well as the financial data of jobseeking benefits (for example, average monthly amount, average support paid for the number of participants on the closing date, for exiters, and those who found placement).

The jobseeking benefit register can also monitor the average duration of the period of benefit allocation and the average monthly amount of the benefits allocated.

For the period between 1991 and 1996, the register also contains the stock and flow data of the recipients of new entrant's unemployment benefit. Between 1997–2005, the system also contained the recipients of pre-retirement unemployment benefit.

Jobseeking allowance recipients: from September 1, 2011 the conditions for determining and disbursing the jobseeking allowance changed. The two phases of the jobseeking allowance were discontinued, the period of entitlement decreased from 270 days to 90 days. Jobseekers needed to have at least 360 days of worktime counting towards entitlement in the 5 years prior to becoming a jobseeker (prior to September 1, 2011, this was 365 days in the prior 4 years). Its amount is 60% of the allowance base, but maximum the amount of the smallest mandatory wage on the first day of the entitlement (allowance base: the monthly average amount from the four calendar quarters preceding the submission of the application).

Jobseeking assistance recipients: from September 1, 2011 the conditions for determining and disbursing the jobseeking assistance changed. The "a" and "b" type of benefit were discontinued, jobseekers can still request the "c" type of benefit under the title of pre-retirement jobseeking benefit, but the period of entitlement (and depletion) of at least 140 days decreased to 90 days.

Regular social assistance recipients: those from among the regular registered jobseekers who are of active age and are in a disadvantaged labour market position, and who receive social assistance to complement or substitute their income. From January 1st, 2009, those receiving regular social assistance were included in two categories: regular social assistance recipients, and recipients of on call support. This support was replaced by a new type of assistance, the wage replacement support from 2011. January 1st, then from 2011. September 1st, the name was changed to employment substitution support. (Legislation III. of 1993 pertaining to social management and social assistance.

Based on the records of labour demand needs reported to the NFSZ, the stock and flow data of vacancies are also processed and published for each month.

Furthermore, detailed monthly statistics of participation in the different active programmes, number of participants, and their inflows and outflows are also prepared based on the disbursed assistance.

The very detailed monthly statistics – in a breakdown by country, region, county, local employment office service delivery area and community – build on the secondary processing of administrative records that are generated virtually as the rather important and useful "by-products" of the accomplishment of the NFSZ's main functions (such as placement services, payment of benefits, active programme support, etc.).

The NMH (and its predecessors, i. e. OMK – National Labour Centre, OMMK and OMKMK) has published the key figures of these statistics on a monthly basis since 1989. The denominators of the unemployment rates calculated for the registered unemployed/jobseekers are the economically active population data published by the KSH MEM.

The figures of the number of registered unemployed/jobseekers and the registered unemployment rate are obviously different from the figures based on the KSH MEF. It is mainly the different conceptual approach, definition, and the fundamentally different monitoring/measuring methods that account for this variance.

Short-Term Labour Market Projection Surveys – NMH PROG

At the initiative and under the co-ordination of the NMH (and its legal predecessors), the NFSZ conducted the so-called short term labour market projection since 1991, twice a year, in March and September, by interviewing over 7500 employers. Since 2004 the survey is conducted once a year, in the month of September.

The interviews focus on the companies' projections of their material and financial processes, their development and human resource plans, and they are also asked about their concrete lay-off or recruitment plans, as well as their expected need for any active labour market programmes.

The surveys are processed from bottom up, from the service delivery areas, through counties, to the whole country, providing useful information at all levels for the planning activities of the NFSZ.

The survey provides an opportunity and possibility for the regions, the counties and Budapest to analyse in greater depth (also using information from other sources) the major trends in their respective labour markets, to make preparations for tackling problems that are likely to occur in the short term, and to effectively meet the ever-changing needs of their clients.

The forecast is only one of the outputs of the survey. Further very important "by-products" include regular and personal liaison with companies, the upgraded skills of the placement officers and other administrative personnel, enhanced awareness of the local circumstances, and the adequate orientation of labour market training programmes in view of the needs identified by the surveys.

The prognosis surveys are occasionally supplemented by supplementary questions and sets of questions to obtain some further useful information that can be used by researchers and the decision-makers of employment and education/ training policy.

From 2005, the surveys are conducted in cooperation with the Institute for Analyses of the Economy and Entrepreneurship of the Hungarian Chamber of Industry and Commerce (in Hungarian: Magyar Kereskedelmi és Iparkamara Gazdaság- és Vállalkozáskutató Intézet, MKIK GVI), with one additional benefit being that with the help of the surveyors of the Institute, the sample size has increased to nearly 8000.

Wage Survey Database – NMH BT

The NMH (and its legal predecessors) has conducted since 1992, once a year, a representative survey with a huge sample size to investigate individual wages and earnings, at the request of the Ministry of National Economy (and its legal predecessors).

The reference month of data collection is the month of May in each year, but for the calculation of the monthly average of irregularly paid benefits (beyond the base wage/salary), 1/12th of the total amount of such benefits received during the previous year is used.

In the competitive sector, the data collection initially only covered companies of over 20 persons; it was incumbent on all companies to provide information, but the sample includes only employees born on certain dates in any month of any year.

Data collection has also covered companies of 10–19 since 1995, and companies of 5–9 have been covered since 2000, where the companies actually involved in data collection are selected at random (ca. 20 per cent), and the selected ones have to provide information about all of their full-time employees.

Data on basic wages and earnings structure can only be retrieved from these surveys in Hungary, thus it is practically these huge, annually generated databases

that can serve as the basis of the wage reconciliation negotiations conducted by the social partners.

In the budgetary sector, all budgetary institutions provide information, regardless of their size, in such a way that the decisive majority of the local budgetary institutions – the ones that are included in the TAKEH central payroll accounting system – provide fully comprehensive information, and the remaining budgetary institutions provide information only about their employees who were born on certain days (regarded as the sample).

Data has only been collected on the professional members of the armed forces since 1999.

Prior to 1992, such data collection took place in every third year, thus we are in possession of an enormous data base for the years of 1983, 1986 and 1989 too.

Of the employees included in the sample, the following data are available:

– the sector the employer operates in, headcount, employer's local unit, type of entity, ownership structure

– employee's wage category, job occupation, gender, age, educational background.

Based on the huge databases which include the data by individual, the data is analysed every year in the following ways:

– Standard data analysis, as agreed upon by the social partners, used for wage reconciliation negotiations (which is received by every confederation participating in the negotiations).
– Model calculations to determine the expected impact of the rise of the minimum wage.
- Analyses to meet the needs of the Wage Policy Department, Ministry of National Resources, for the analysis and presentation of wage ratios
- Analyses for the four volume statistical yearbook (total national economy, competitive sector, budgetary sector, and regional volumes).

The entire database is adopted every year by the KSH, which enables the Office to also provide data for certain international organisations, (e. g. ILO and OECD). The NMH also regularly provides special analyses for the OECD.

The database containing the data by individual allows for a) the analysis of data for groups of people determined by any combination of pre-set criteria, b) the comparison of basic wages and earnings, with special regard to the composition of the different groups analysed, as well as c) the analysis of the dispersion of the basic wages and earnings.

Since 2002, the survey of individual wages and earnings was substantially developed to fulfill all requirements of the EU, so from this time on it serves also for the purposes of the Structure of Earnings Survey (SES), which is obligatory for each member state in every fourth year. One important element of the changes was the inclusion of part-time employees in the sample since 2002.

SES 2002 was the first, and recently the database of SES 2006, 2010 was also sent to the Eurostat in anonymized form in accordance with EU regulations.

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